ORDER NO. VRD-7904-313

Service Manual

Video Cassette Recorder

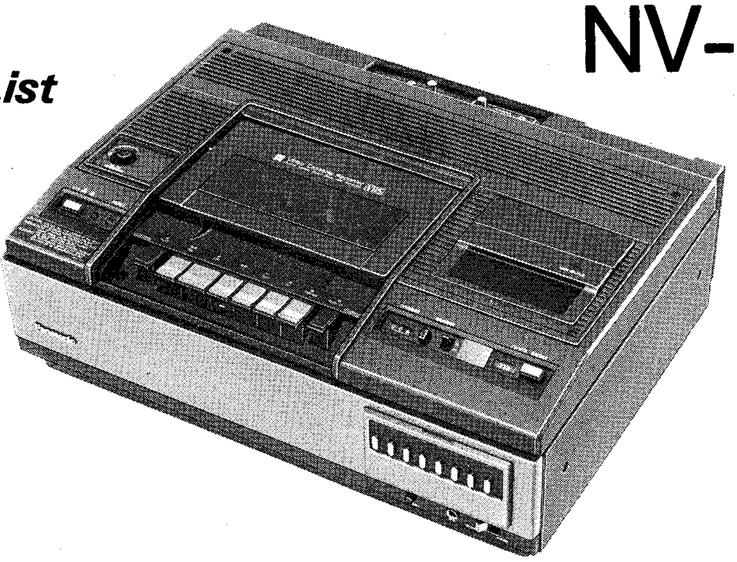
Panasonic VHS

Vol. 4

NV-8610

Exploded View
Replacement Parts List

AUER & MÜLLER
ernseh Rundfunk - Spezialwerkstatt
tader Str. 35, 2800 BREMEN 1
Tel. 0421 / 49 83 51 - 52



SPECIFICATIONS

Power Source: NV-8610E, B
110V/127V/220V/240V AC, 50Hz
NV-8610EO: 220V AC, 50Hz
Power Consumption: Approx. 39 watts
Television System: CCIR: 625 lines, 50 fields
PAL colour signal
Video Recording System: 2 rotary heads, helical scanning, VHS system azimuth recording
Luminance: FM recordings, 3.8—4.8MHz
Colour signal: converted subcarrier phase shift recording, 627kHz
Audio Track: 1 track
Tape: Tape width 12.7mm, super high density tape
Tape Speed: 23.39mm/sec.
Video Track Width: 0.049mm
Video Head Gap Azimuth: 6°
Audio Track Width: 1.0mm
Control Track Width: 0.75mm
Record/Playback Time: 180 min. with NV-E180
FF/REW Time: Less than 4.5 min. with NV-E180
Horizontal Resolution: B/W: more than 300 lines
Colour: more than 240 lines
Audio Frequency Response: 80 to 10,000Hz
Signal-to-Noise Ratio: Video: more than 43dB
Audio: more than 43dB
Operating temperature: 5°C to 40°C
Operating Humidity: 10% to 75%
Heads: Video: 2 rotary heads
Audio/Control: 1 stationary head
Erase: 1 full track erase
1 audio dubbing erase

Inputs: Video: 1.0Vp-p, 75Ω unbalanced (BNC)
Audio: MIC −70dB, 600Ω unbalanced (M6)
LINE −20dB, 100kΩ unbalanced (BNC)
Pause remote: Short circuited (M2)
Camera remote: (M2)
TV tuner: E type: VHF ch. 2—12.
UHF ch. 21—69
EO type: VHF ch. E2—M1, M2—U9
UHF ch. 21—69
B type: UHF ch. 21—69
75Ω unbalanced (DIN)
Outputs: Video: 1.0Vp-p, 75Ω unbalanced (BNC)
Audio: LINE −6dB, 600Ω unbalanced (BNC)
RF converter: UHF ch. 36±3
75Ω unbalanced (DIN)
Weight: Approx. 16.5kg
Dimensions: Approx. 485(W)×176(H)×368(D)mm
Standard Accessories: Video cassette tape, NV-E120×1
DIN-DIN 75Ω coaxial cable, 2m long×1
Remote pause controller, NV-A181, (6m)×1
Dust cover×1
Optional Accessories: VHS cassette tape
NV-E60 (1 hr)
NV-E120 (2 hrs)
NV-E180 (3 hrs)
B/W video camera, WV-460E
(Extension cable and wide-angle adaptor lens are also available.)
Portable PAL colour camera, WV-3300E

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

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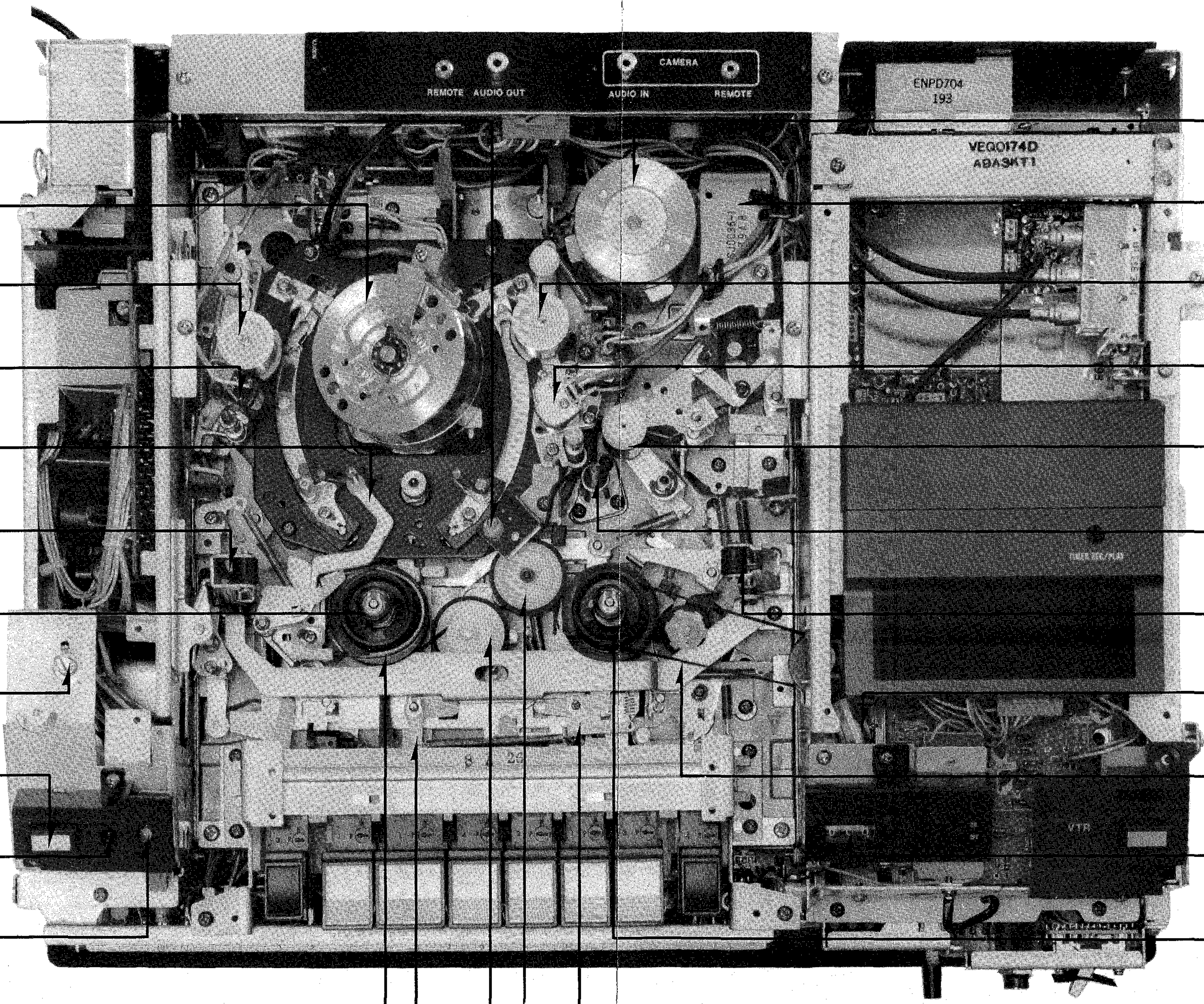
INNER PARTS LOCATION

Top View



Sensor Lamp XAMV0019

D.D. Cylinder Unit VEG0140/
Upper Cylinder Unit VEH0099

Supply Inertia Roller Unit VXP0247

Full Erase Head VBS0014

Tension Arm Unit VXL0576

Cassette Lock Arm B Unit VXL0557

Supply Reel Table Unit VXR0064

Tracking Volume EVHCHAK15B15

Push Button Unit VXU0081
Power Switch ESB70134

L.E.D. (POWER) GL52AR

L.E.D. (DEW) LN41YP

Tension Band Unit VXZ0056

Brake Arm VML0927

Capstan Motor Unit VEM0099

Pressure Roller Solenoid VSJ0036

Takeup Inertia Roller Unit VXP0247

Audio/Control Head VBR0031

Pressure Roller Arm Unit VXP0234

Capstan Holder Unit VXD0032

Cassette Lock Arm A Unit VXL0580

Counter Belt B VDV0076

Counter Belt A VDV0075

Tape Counter VDC0014

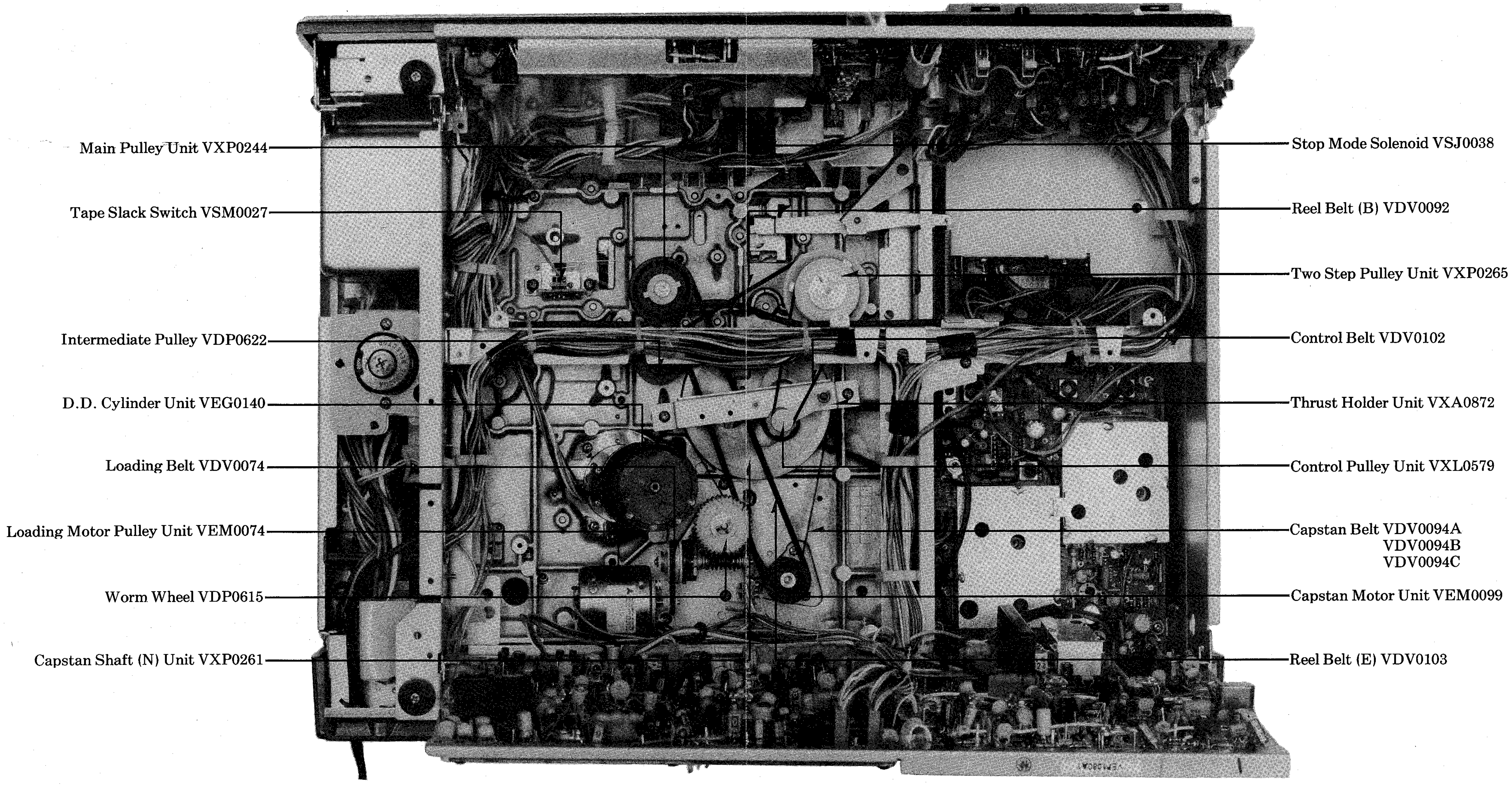
Takeup Reel Table Unit VXR0065

Brake B Unit VXZ0055

F.F. Idler Unit VXP0245

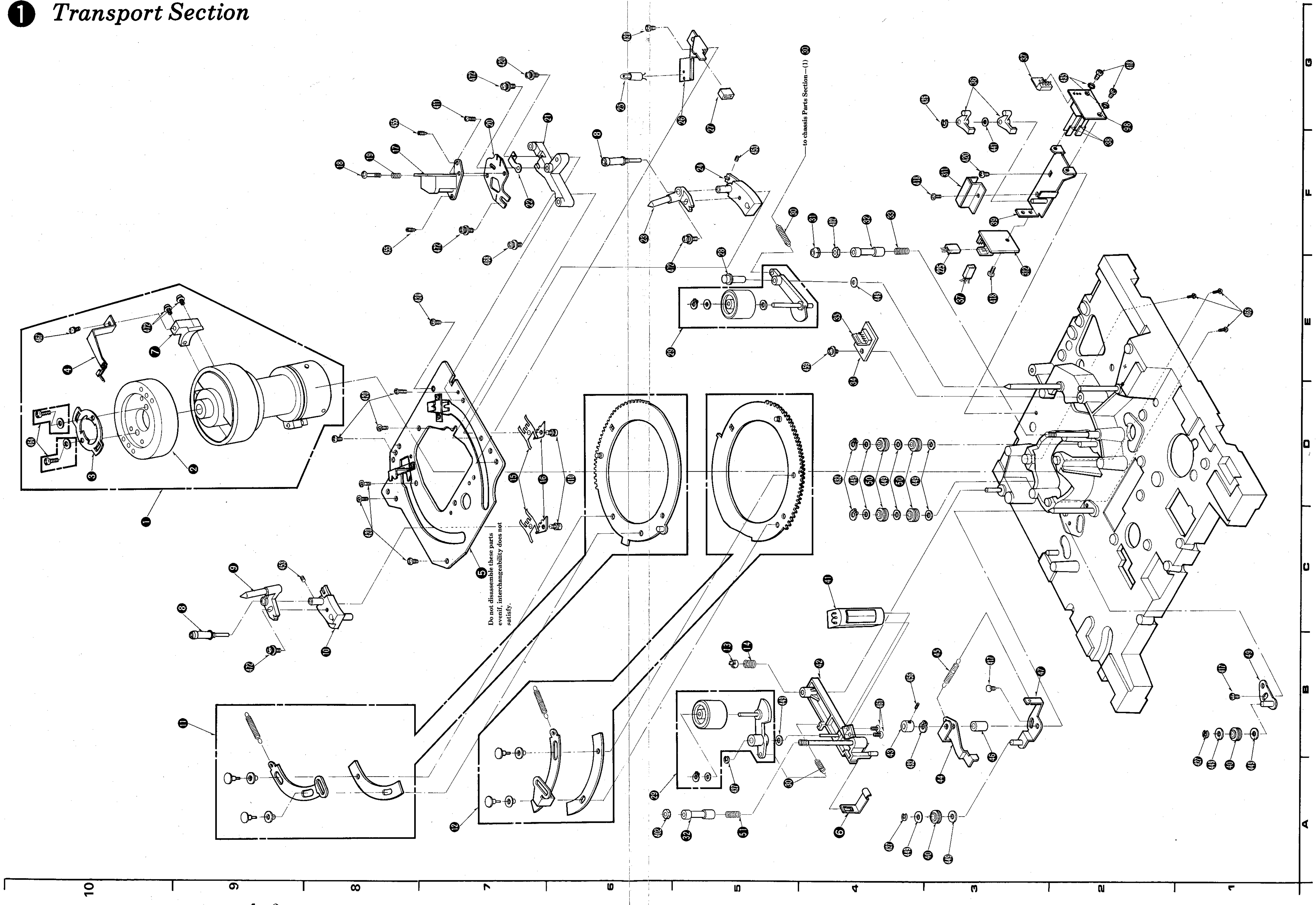
Rewind Roller Unit VXP292

Bottom View


Main Pulley Unit VXP0244
Tape Slack Switch VSM0027
Intermediate Pulley VDP0622
D.D. Cylinder Unit VEG0140
Loading Belt VDV0074
Loading Motor Pulley Unit VEM0074
Worm Wheel VDP0615
Capstan Shaft (N) Unit VXP0261
Stop Mode Solenoid VSJ0038
Reel Belt (B) VDV0092
Two Step Pulley Unit VXP0265
Control Belt VDV0102
Thrust Holder Unit VXA0872
Control Pulley Unit VXL0579
Capstan Belt VDV0094A
VDV0094B
VDV0094C
Capstan Motor Unit VEM0099
Reel Belt (E) VDV0103

EXPLODED VIEW & PARTS LIST

❶ *Transport Section*



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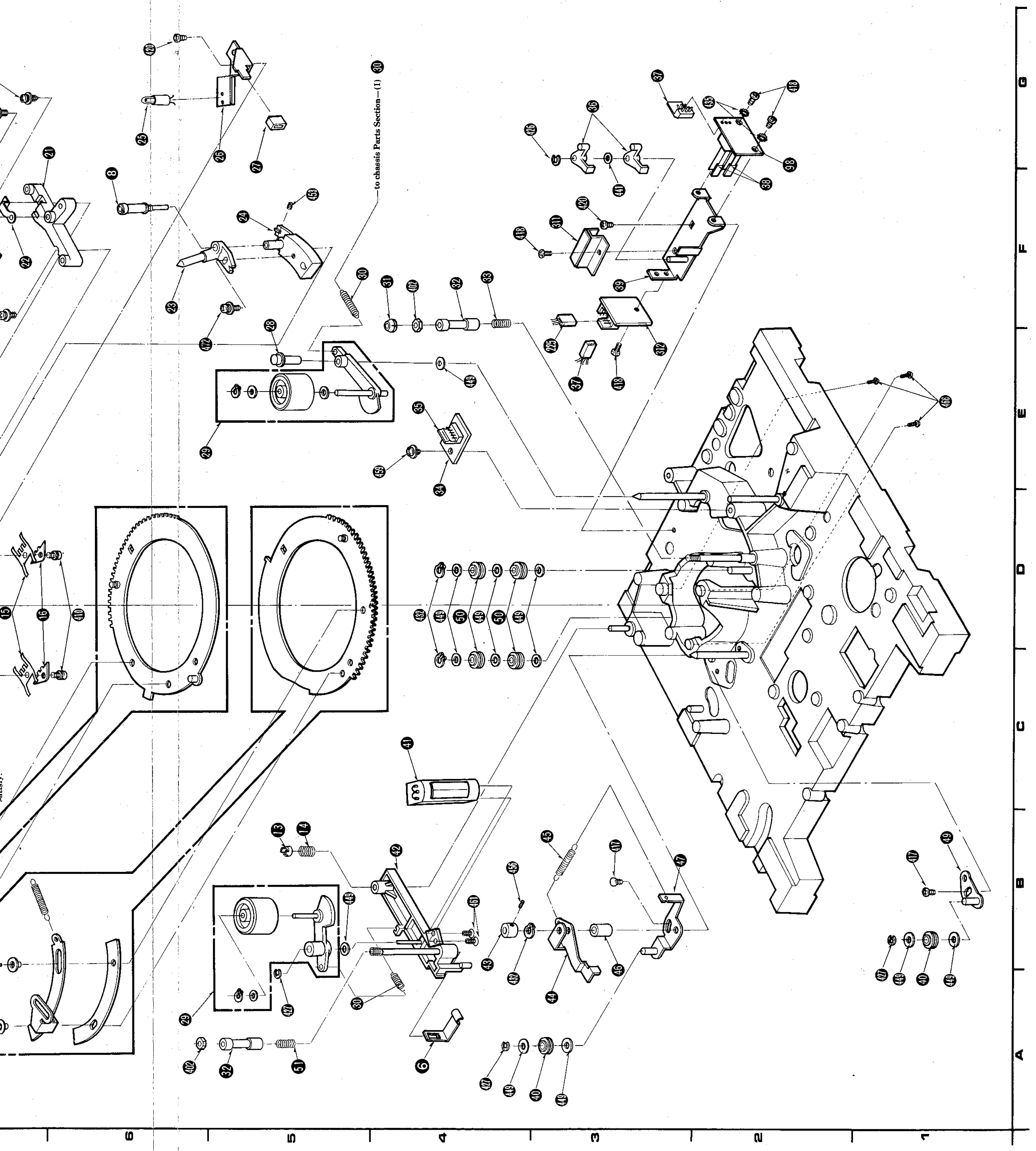
to chassis Parts Section—(1) 60

Do not disassemble these parts evenif, interchangeability does not satisfy.

Ref.



Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
1		VEG0140	D.D Cylinder Unit	1	
2		VEH0099	Upper Cylinder Unit	1	
3		VMA3165	Wire Cover	1	
4		VXA0869	Brush Angle Unit	1	
5		VUK4015	Loading Base Unit	1	
6		VMB0535	Leaf Spring	1	
7		VRH0004	Heater Unit	1	
8		VXP0239A	Roller Post Unit	2	
9		VXA0853	Inclined Base A Unit	1	
10		VXA0856	Shaft Holder A Unit	1	
11		VXA1024	Loading Ring A Unit	1	
12		VXA0923	Loading Ring B Unit	1	
13		VMX0205	Spring Stopper	1	
14		VMB0531	Head Arm Spring	1	
15		VMA2560	Shaft Holder Spring	2	
16		VMA3106	Protector S	2	
17		VBR0031	Audio/Control Head	1	
18		VHD0032	Adjust Screw	1	
19		VMB0404	Adjust Spring	1	
20		VMA2553	Head Base B	1	
21		VMD0075	Head Base F	1	
22		VSC0348	Ground Plate	1	
23		VXA0854	Inclined Base B Unit	1	
24		VXA0855	Shaft Holder B Unit	1	
25		XAMV0019	Sensor Lamp	1	
26		VXA0731	Lamp Bracket Unit	1	
27		VMG0170	Stand Cushion	1	
28		VDP0663	Panel Support	1	
29		VXP0247	Inertia Roller Arm Unit	2	
30		VMB0418	Inertia Roller Spring	2	
31		VMX0203	Limiter Cap	1	
32		VMX0186	Post Sleeve	2	
33		VMB0478	Post Spring	1	
34		VJB00460	A/C Head P.C.Board	1	
35		VJP0090	5 Pin Header	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
36		VML0571	Switch Link	2	
37		VJP0092	3 Pin Header	2	
38		QSB0234	Leaf Switch	2	
39		VXA0947	Switch Bracket Unit	1	
40		VDP0546	Loading Roller	2	
41		VBS0014	Full Erase Head	1	
42		VXK0322	Erase Head Base Unit	1	
43		VMX0121	Cassette Support	1	
44		VML0735	Charging Link	1	
45		VMB0569	Charging Link Spring	1	
46		VMX0139	Spacer	1	
47		VXA0705	Roller Bracket A Unit	1	
49		VXA0706	Roller Bracket B Unit	1	
50		VDP0692	Loading Roller B	4	
51		VMB0532	Post Spring	1	
98		VJB00310	Leaf Switch P.C.Board	1	
225		VJP0089	3 Pin Header	1	
311		VRT0004	Thermo Switch	1	
312		VJB00341	Thermo Switch P Board	1	
402		XNG4	Nut	2	
410		XSN3+6S	Screw	2	
411		XSN3+8S	Screw	1	
417		XTV3+6RS	Tapping Screw	2	
418		XTV3+6S	Tapping Screw	4	
420		XTV3+8S	Tapping Screw	12	
426		XUC25FP	Retaining Ring	1	
427		XUC3FP	Retaining Ring	3	
432		XUEV4FP	Retaining Ring	3	
435		XWC3BF	Sword Tooth Washer	2	
441		XWXV3D	Polyslider Washer	1	
449		XWXV4D9	Polyslider Washer	12	
453		XXE2D2FP	Setscrew	2	
455		XXE3A6	Setscrew	2	
456		XXE3D4KS	Setscrew	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
459		XYE3+BJ10	Screw	1	
461		XYN2+C6	Screw w/Spring Washer	2	
464		XYN3+B10BNC	Screw w/Spring Washer	2	
466		XYN3+C12S	Screw w/Spring Washer	3	
467		XYN3+C6S	Screw w/Spring Washer	1	
468		XYN3+8S	Screw w/Spring Washer	1	
472		XYN3+F8S	Screw w/Spring & Flat Washer	6	

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LIST ❶-3

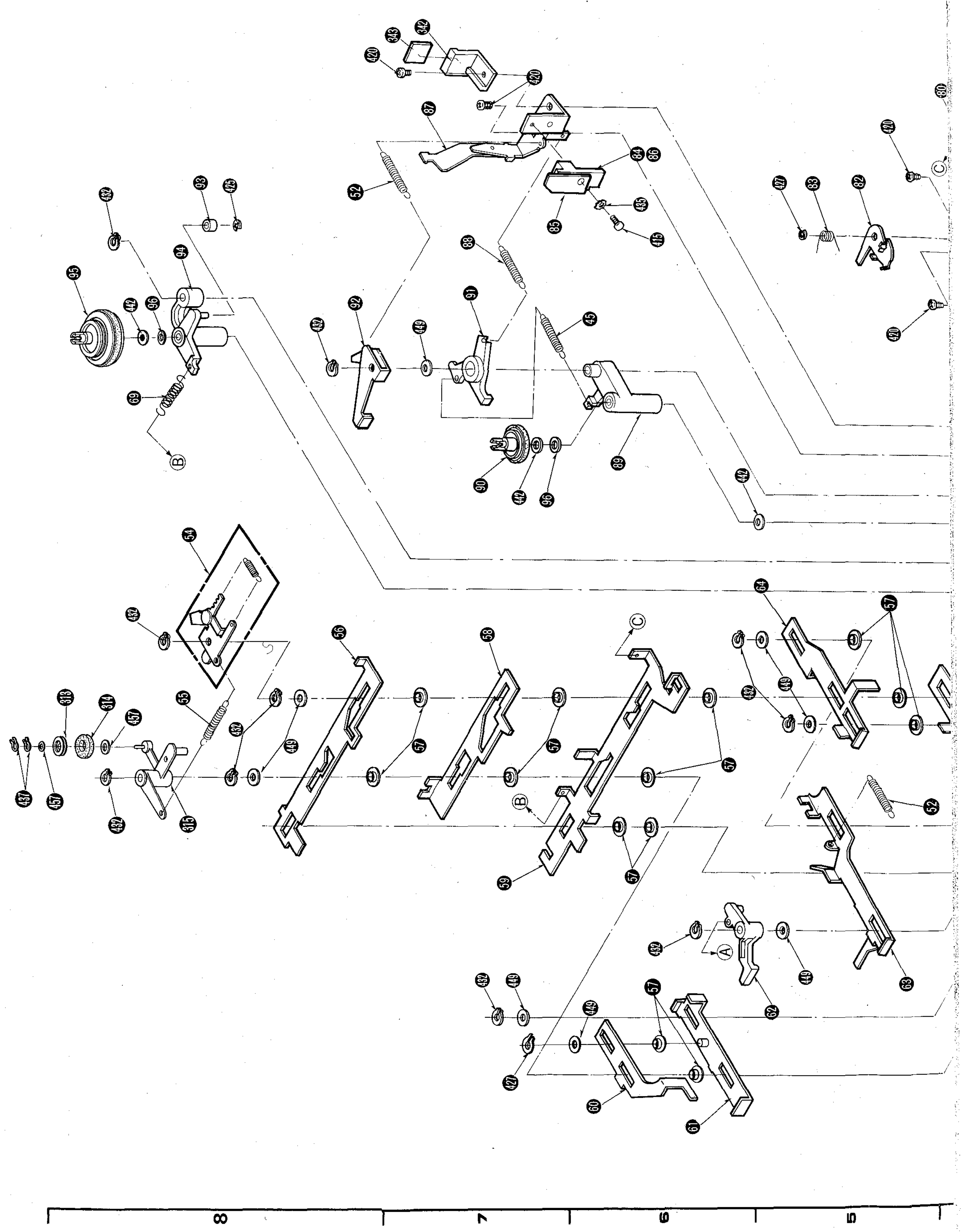
Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
459		XYE3+BJ10	Screw	1	
461		XYN2+C6	Screw w/Spring Washer	2	
464		XYN3+B10BNC	Screw w/Spring Washer	2	
466		XYN3+C12S	Screw w/Spring Washer	3	
467		XYN3+C6S	Screw w/Spring Washer	1	
468		XYN3+8S	Screw w/Spring Washer	1	
472		XYN3+F8S	Screw w/Spring & Flat Washer	6	

LIST ❷-1

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
45		VMB0399	Play Arm Spring A	1	
52		VMB0410	Play Lever Spring	2	
54		VXZ0055	Brake B Unit	1	
55		VMB0414	Brake Arm Spring	1	
56		VML0551	F.F Slide Lever	1	
57		VMX0122	Slide Washer A	15	
58		VML0550	Check Slide Lever	1	
59		VML0549	REW Slide Lever	1	
60		VML0810	Charge Slide Lever B	1	
61		VXL0578	Charge Slide Lever A Unit	1	
62		VML0553	F.F Lever	1	
63		VML0730	Play Slide Lever	1	
64		VML0853	REC Slide Lever A	1	
65		VML0552	REW Lever	1	
66		VMB0409	Eject Lever Spring	1	
67		VML0805	Eject Lever	1	
68		VML0555	Safety Link	1	
69		VMB0398	Rewind Arm Spring	2	
70		VXP0244	Main Pulley Unit	1	
71		VDV0103	Reel Belt (E)	1	
72		VXP0265	Two Step Pulley Unit	1	
73		VML0545	Soft Brake Unit	1	
74		VML0725	Action Lever	1	
75		VXL0456	F.F Arm Unit	1	
76		VMB0401	F.F Arm Unit	1	
77		VMA2543	Spring Hook	1	
78		VXP0245	F.F Idler Unit	1	
79		VMB0423	Lock Spring	1	
80		VMB0430	Return Spring B	1	
81		VXL0559	Pause Slide Lever (1) Unit	1	
82		VML0590	Cycle Plate	1	
83		VMB0428	Cycle Plate Spring	1	
84		VMA2568	Transistor Holder	1	
85		VJB00183	Takeup Sensor P.C.Board	1	
86		PN150NV	Photo Transistor	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
87		VXA0849	Cassette Opener Unit	1	
88		VMB0533	Play Arm Spring B	1	
89		VML0727	Play Arm (B)	1	
90		VXP0243	Play Idler Unit	1	
91		VML0530	Sub Play Arm	1	
92		VXZ0051	Sub Tension Arm B Unit	1	
93		VDP0543	Sub Roller A	1	
94		VXL0405	Rewind Arm Unit	1	
95		VXP292	Rewind Roller Unit	1	
96		VMX0157	Thrust Washer	2	
97		VML0554	Connecting Link	1	
313		VDP0718	Brake Roller	1	
314		VMG0199	Brake Roller Rubber	1	
315		VML0927	Brake Arm	1	
316		VML0548	REC Slide Lever B	1	
342		VMD0011	Dew Detector Bracket	1	
343		VSQ0054	Dew Detector	1	
415		XTV3+10S	Tapping Screw	1	
420		XTV3+8S	Tapping Screw	4	
425		XUC2FP	Retaining Ring	1	
426		XUC25FP	Retaining Ring	1	
427		XUC3FP	Retaining Ring	3	
432		XUEV4FP	Retaining Ring	13	
435		XWC3BF	Sword Tooth Washer	1	
437		XUEV2FP	Retaining Ring	2	
441		XWXV3D	Polyslider Washer	2	
442		XWXV3D54	Polyslider Washer	4	
449		XWXV4D9	Polyslider Washer	14	
457		XWXV2D	Polyslider Washer	2	

❷ *Moving Mechanism Section*



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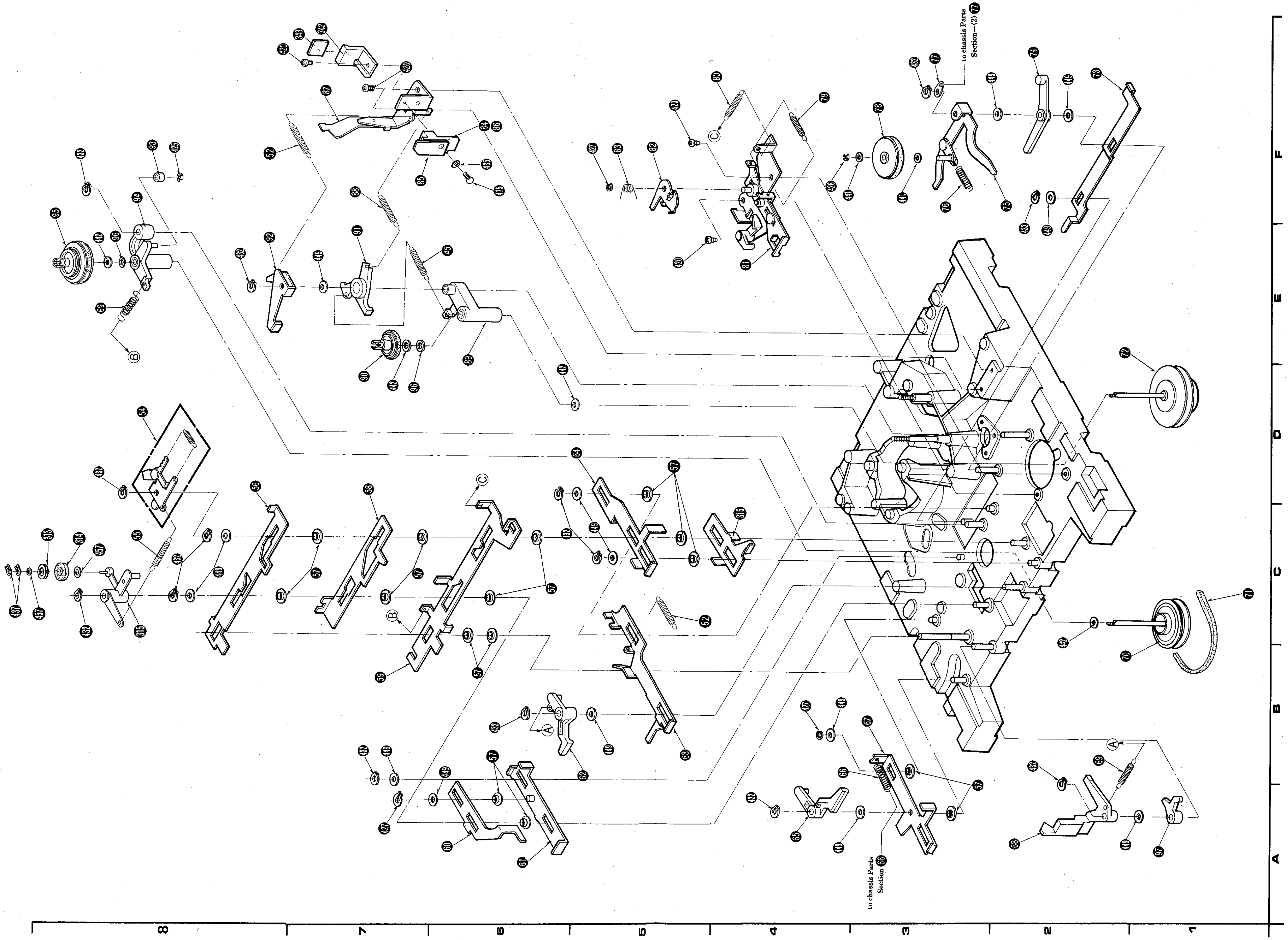
❷ *Moving Mechanism Section*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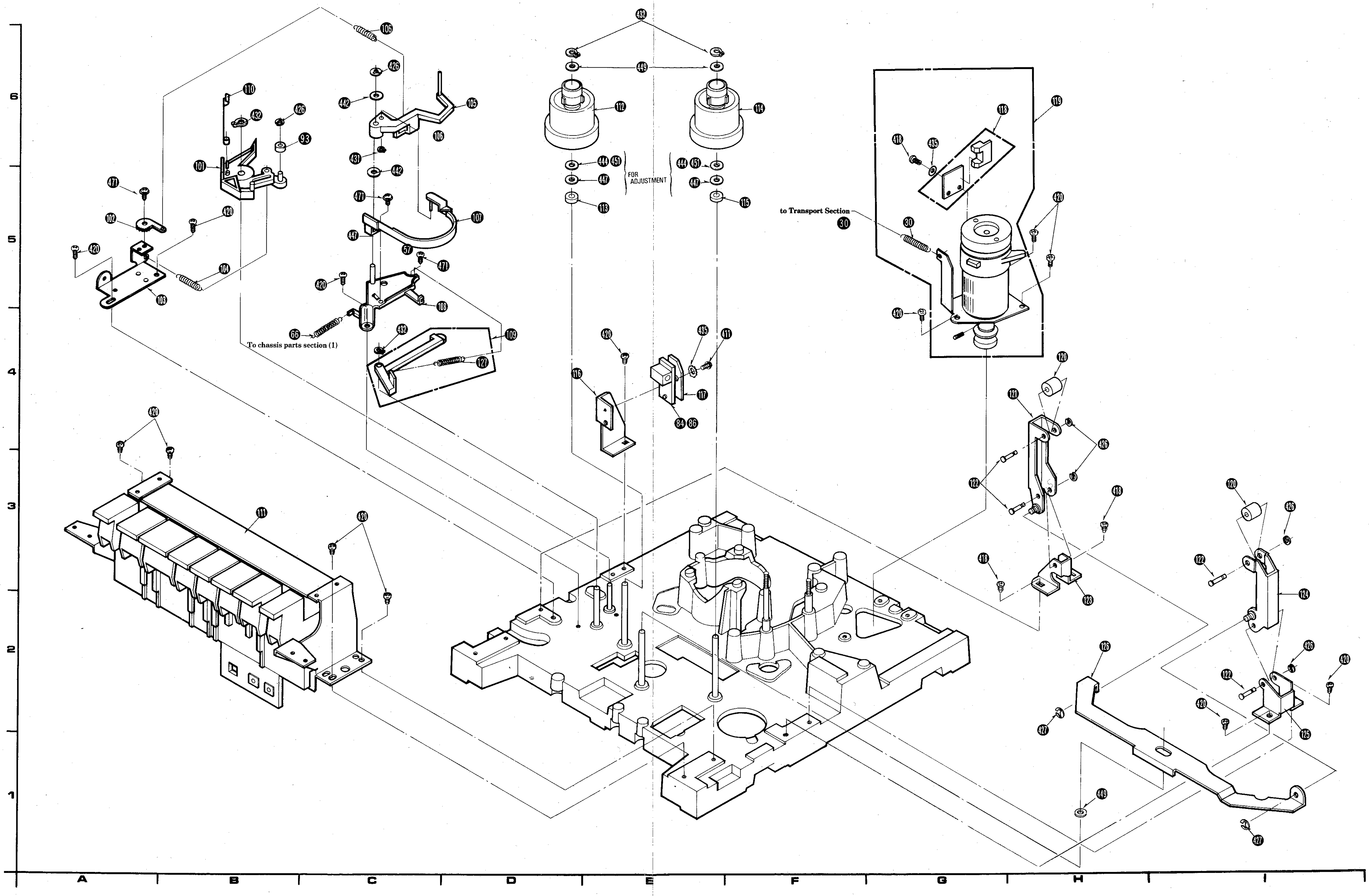
❸ *Chassis Parts Section-(1)*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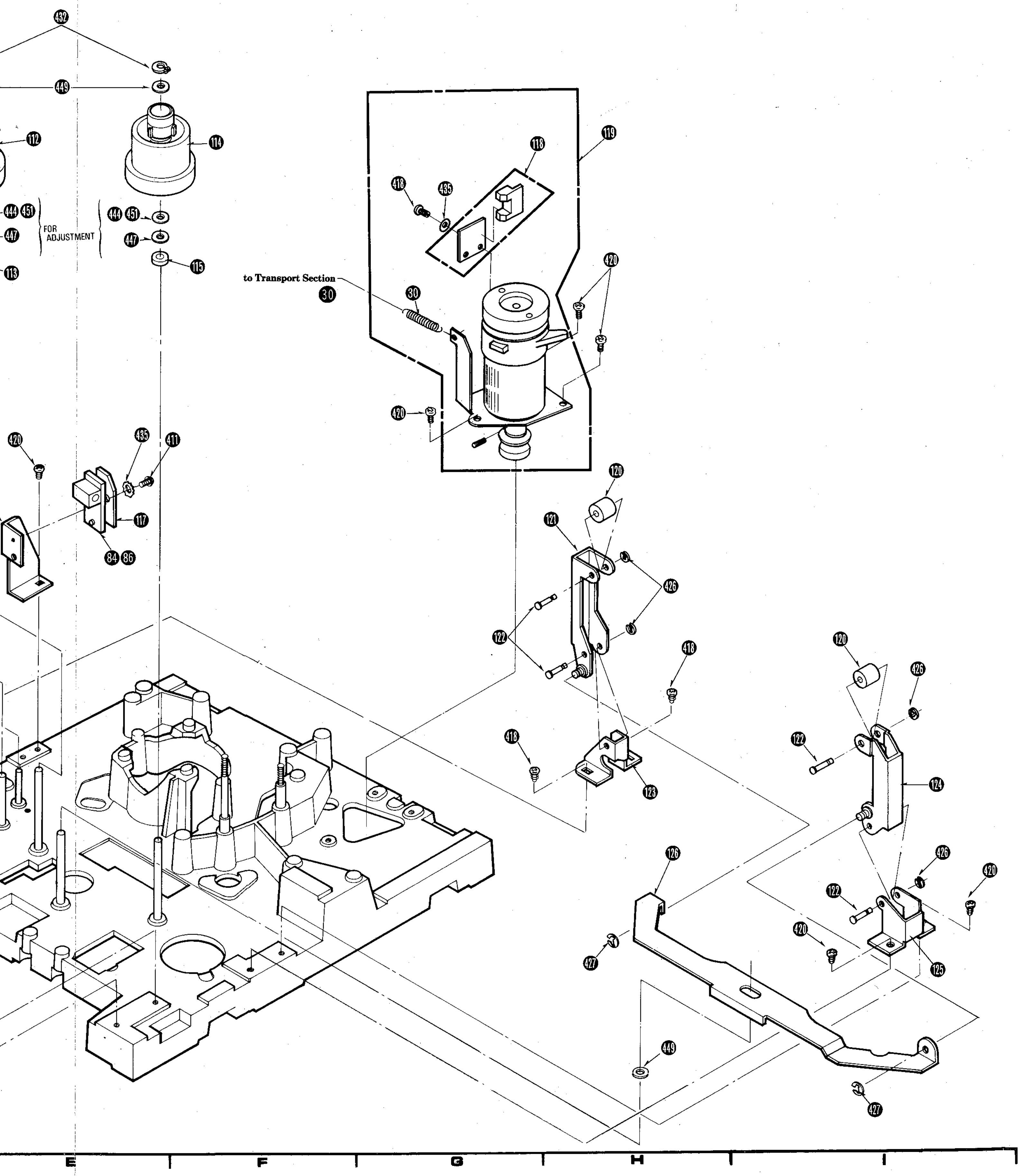
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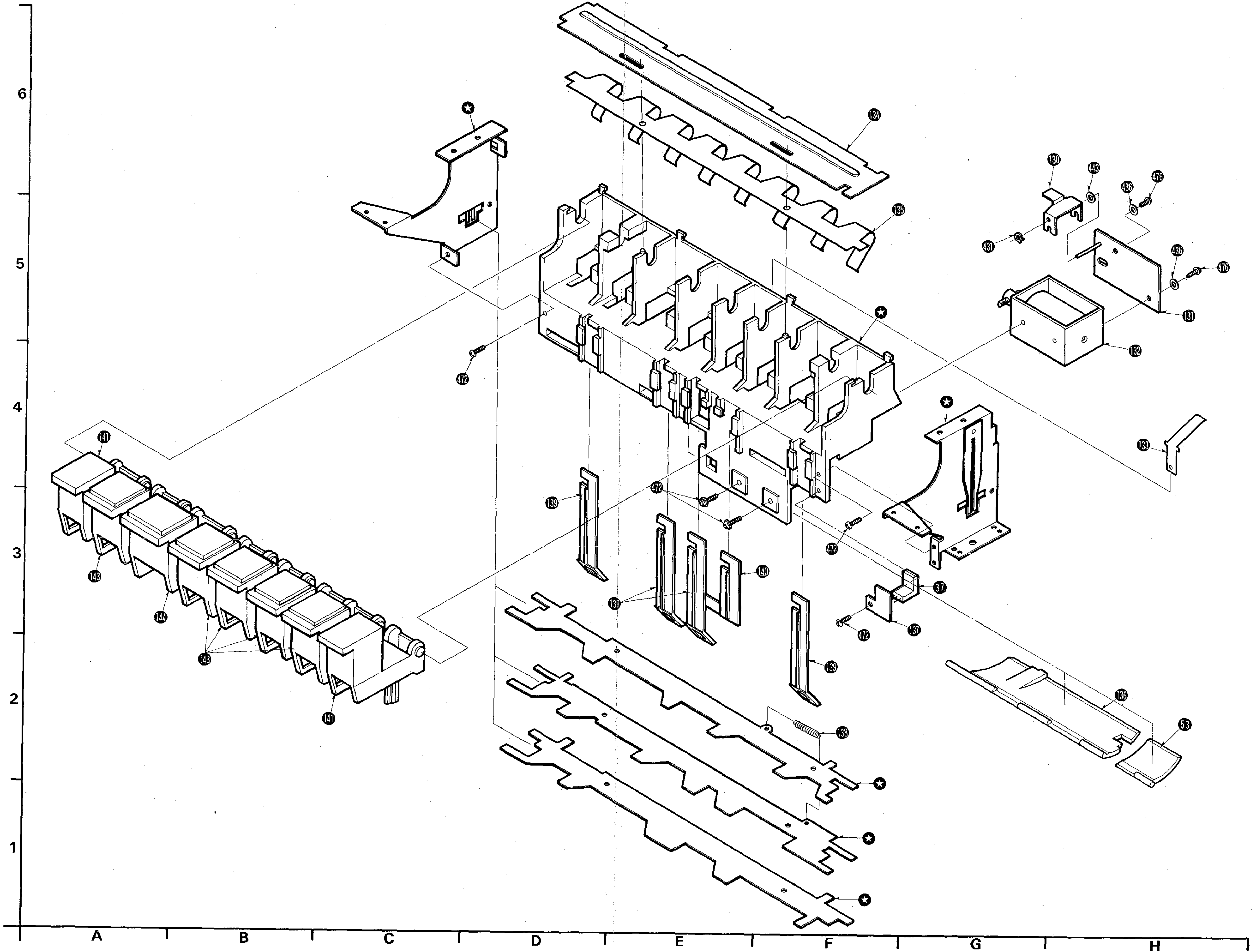
Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
30		VMB0418	Inertia Roller Spring	1	
84		VMA2568	Transistor Holder	1	
86		PN150NV	Photo Transistor	1	
93		VDP0543	Sub Roller A	1	
101		VXL0573	Band Release Lever (1) Unit	1	
102		VMA3365	Tension Spring Hook	1	
103		VMA3364	Cassette Stud Base	1	
104		VMB0529	Release Lever Spring	1	
105		VXL0576	Tension Arm Unit	1	
106		VMB0530	Tension Spring	1	
107		VXZ0056	Tension Band Unit	1	
108		VXK0301	Tension Arm Base Unit	1	
109		VXL0575	Loading Tension Arm Unit	1	
110		VMB0528	Release Lever Spring	1	
111		VXU0113	Function Button Unit	1	
112		VXR0064	Supply Reel Table Unit	1	
113		VDB0364	Thrust Bearing	1	
114		VXR0065	Takeup Reel Table Unit	1	
115		VMX0146	Spacer	1	
116		VMA3435	Transistor Bracket	1	
117		VJB00132	Supply Sensor P.C.Board	1	
118		VEK0494	Capstan Motor C.B.Assy	1	
119		VEM0099	Capstan Motor Unit	1	
120		VDP0552	Cassette Lock Roller	2	
121		VXL0580	Cassette Lock Arm A Unit	1	
122		VMS1314	Lock Roller Pin	4	
123		VMA2585	Cassette Stud A	1	
124		VXL0557	Cassette Lock Arm B Unit	1	
125		VMA2586	Cassette Stud B	1	
126		VML0806	Connect Lever	1	
127		VMB0560	Loading Tension Spring	1	
418		XTV3+6S	Tapping Screw	3	
420		XTV3+8S	Tapping Screw	14	
426		XUC25FP	Retaining Ring	6	
427		XUC3FP	Retaining Ring	2	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
431		XUEV3FP	Retaining Ring	1	
432		XUEV4FP	Retaining Ring	4	
435		XWC3BF	Sword Tooth Washer	2	
442		XWXV3D54	Polyslider Washer	2	
444		XWXV4A65	Polyslider Washer	2	
447		XWXV4D65	Polyslider Washer	2	
449		XWXV4D9	Polyslider Washer	3	
451		XWXV4Z65	Polyslider Washer	2	
471		XYN3+F6S	Screw w/Spring & Flat Washer	2	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
37		VJP0092	3 Pin Header	1	
53		VMA3355	Lock Plate (C)	1	
111		VXU0113	Function Button Unit	1	
130		VMA3360	Lock Release	1	
131		VXA0875	Release Plate Unit	1	
132		VSJ0038	Stop Mode Solenoid	1	
133		VMA3702	Lock Release Spring	1	
134		VMA3370	Spring Holder	1	
135		VMA3371	Button Spring	1	
136		VMA3354	Lock Plate (B)	1	
137		VJB00340	Stop Solenoid P.C. Board	1	
138		VMB0538	Slide Lever Spring	1	
139		VMA3358	Slide Lever (A)	4	
140		VMA3359	Slide Lever (B)	1	
141		VXU0117	Button (C) Unit	2	
143		VXU0129	Button (A) Unit	5	
144		VXU0137	Button (B) Unit	1	
431		XUEV3FP	Retaining Ring	1	
436		XWG3F8	Flat Washer	2	
443		XWXV3D6	Polyslider Washer	1	
472		XYN3+F8S	Screw w/Spring & Flat Washer	5	
476		XYN3+F45FXS	Screw w/Spring Washer	2	

Note: The parts indicated by stars (☆) are not available as single parts, pleases order it as group parts; VXU0113.

❹ *Function Button Section* ((111) *VXU0113*)



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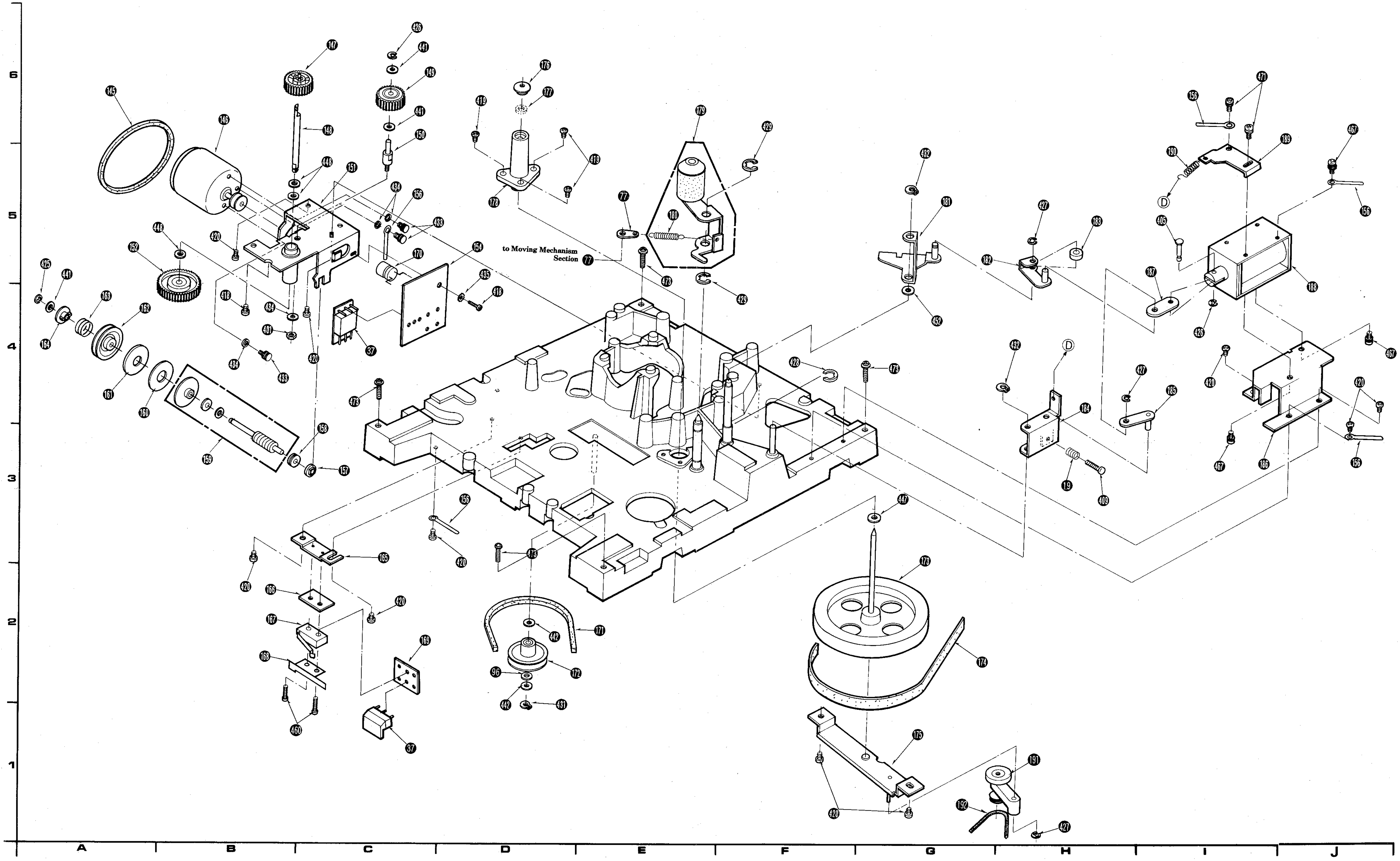
⑤ *Chassis Parts Section-(2)*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to Moving Mechanism Section

LIST ❺-1

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
19		VMB0404	Adjust Spring	1	
37		VJP0092	3 Pin Header	2	
77		VMA2543	Spring Hook	1	
96		VMX0157	Thrust Washer	1	
145		VDV0074	Loading Belt	1	
146		VEM0074	Loading Motor Pulley Unit	1	
147		VDP0614	Loading Gear (A)	1	
148		VMS1349	Worm Wheel Shaft	1	
149		VDP0549	Loading Gear	1	
150		VMS1303	Gear Shaft (A)	1	
151		VXA0858	Loading Motor Bracket Unit	1	
152		VDP0615	Worm Wheel	1	
154		VJB00172	Loading Motor P.C. Board	1	
156		VJR3	Wire Clamper	5	
157		VDB0351	Loading Metal	1	
158		VDB0371	Thrust Bearing	1	
159		VXP0198	Loading Pulley Unit	1	
160		VMF0124	Clutch Felt	1	
161		VME0024	Friction Sheet	1	
162		VDP0561	Loading Pulley	1	
163		VMB0432	Clutch Spring C	1	
164		VDP0562	Clutch Pulley D	1	
165		VMA2598	Micro Switch Bracket	1	
166		VMA5377	Micro Switch Fiber	1	
167		VSM0027	Micro Switch	1	
168		VMB0534	Leaf Spring	1	
169		VJB00309	Micro Switch P.C. Board	1	
170		ECEA50N1E	Capacitor	1	
171		VDV0092	Reel Belt B	1	
172		VDP0622	Intermediate Pulley	1	
173		VXP0261	Capstan Shaft (N) Unit	1	
174		VDV0094A	Capstan Belt	(1)	
174		VDV0094B	Capstan Belt	(1)	Select one of these
174		VDV0094C	Capstan Belt	(1)	
175		VXA0872	Thrust Holder Unit	1	

LIST ❺-2

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
176		VMX0123	Oil Cap	1	
177		VMT0022	Oil Pool	1	
178		VXD0032	Capstan Holder Unit	1	
179		VXP0234	Pressure Roller Arm Unit	1	
180		VMB0403	Return Spring	1	
181		VXL0540	Main Pressure Arm Unit	1	
182		VXL0459	Connecting Lever (A) Unit	1	
183		VMX0147	Spacer	1	
184		VML0537	Spring Hook Lever	1	
185		VXL0552	Connecting Lever (B) Unit	1	
186		VMA2545	Solenoid Bracket	1	
187		VML0534	Solenoid Lever	1	
188		VSJ0036	Pressure Roller Solenoid	1	
189		VMA2546	Spring Hook Angle	1	
190		VMB0405	Pressure Lever Spring	1	
191		VXL0579	Control Pulley Unit	1	
192		VDV0102	Control Belt	1	
401		XNG3	Nut	1	
405		XRHV3XB	Rivet	1	
409		XSN3+12S	Screw	1	
418		XTV3+6S	Tapping Screw	2	
419		XTV3+8RS	Tapping Screw (Red)	3	
420		XTV3+8S	Tapping Screw	10	
425		XUC2FP	Retaining Ring	1	
426		XUC25FP	Retaining Ring	2	
427		XUC3FP	Retaining Ring	3	
428		XUC4FP	Retaining Ring	1	
429		XUC5FP	Retaining Ring	2	
431		XUEV3FP	Retaining Ring	1	
432		XUEV4FP	Retaining Ring	2	
433		XVE3A6S	Hex Hole Screw	3	
434		XWA3	Spring Washer	3	
435		XWC3BF	Sword Tooth Washer	1	
441		XWXV3D	Polyslider Washer	3	

LIST ❺-3

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
442		XWXV3D54	Polyslider Washer	2	
447		XWXV4D65	Polyslider Washer	1	
448		XWXV4D7	Polyslider Washer	3	
452		XWXV5	Polyslider Washer	1	
460		XYN2+C10	Screw w/Spring Washer	2	
467		XYN3+C6S	Screw w/Spring Washer	3	
471		XYN3+F6S	Screw w/Flat & Spring Washers	2	
473		XYN4+C25S	Screw w/Flat & Spring Washers	3	

LIST ❻-1

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
35		VJP0090	5 Pin Header	1	
57		VMX0122	Slide Washer A	1	
195		VMA3333	Left Handle	1	
196		VMA3342	Power Switch Angle	1	
197		VMA3589	Left Side Frame	1	
198		VMA3335	RF Converter Guide Cover	1	
199		VMA3334	RF Converter Guide	1	
200		VMA3328	Rear Frame	1	
201		VMA3326	Center Frame	1	
202		VJF0004	Lead Clamper (Large)	5	
203		VMG0172	Cushion Rubber	3	
204		VML0567	Audio Switch Link	1	
205		VML0568	Servo Switch Link	1	
206		VMB0563	Audio Lever Spring	1	
207		VMB0564	Servo Lever Spring	1	
208		VXA0717	Link Bracket Unit	1	
209		VMA2685	Shaft Guide Angle	1	
210		VML0584	Cassette Lock Lever	1	
211		VMS1112	Lock Shaft	1	
212		VMB0427	Eject Link Spring	1	
213		VXL0481	Eject Link A Unit	1	
214		VMA3362	Eject Link B	1	
215		VMA3322	Front Angle	1	
216		VMA3329	Center Angle	1	
217		VML0801	Audio Slide Lever	1	
218		VML0802	Servo Slide Lever	1	
219		VMA3330	Right Side Angle	1	
220		ENC17319	RF Converter	(1)	for NV-8610E,EO
220		ENC17318	RF Converter	(1)	for NV-8610B
220		ENC17206	RF Converter	(1)	for NV-8610EN
245		VJF0022	Lead Clamper	2	
317		VSC0413	Shield Case P	1	
318		VMA3532	Shield Case Holder	2	
319		VJB00312	Edge Connector P Board	1	
320		VJS1072	Edge Connector	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
412		XSN4+15S	Screw	3	
418		XTV3+6S	Tapping Screw	4	
420		XTV3+8S	Tapping Screw	24	
427		XUC3FP	Retaining Ring	3	
446		XWXV4D	Polyslider Washer	1	
450		XWXV4F9	Polyslider Washer	2	
471		XYN3+F6S	Screw w/Flat & Spring Washers	3	

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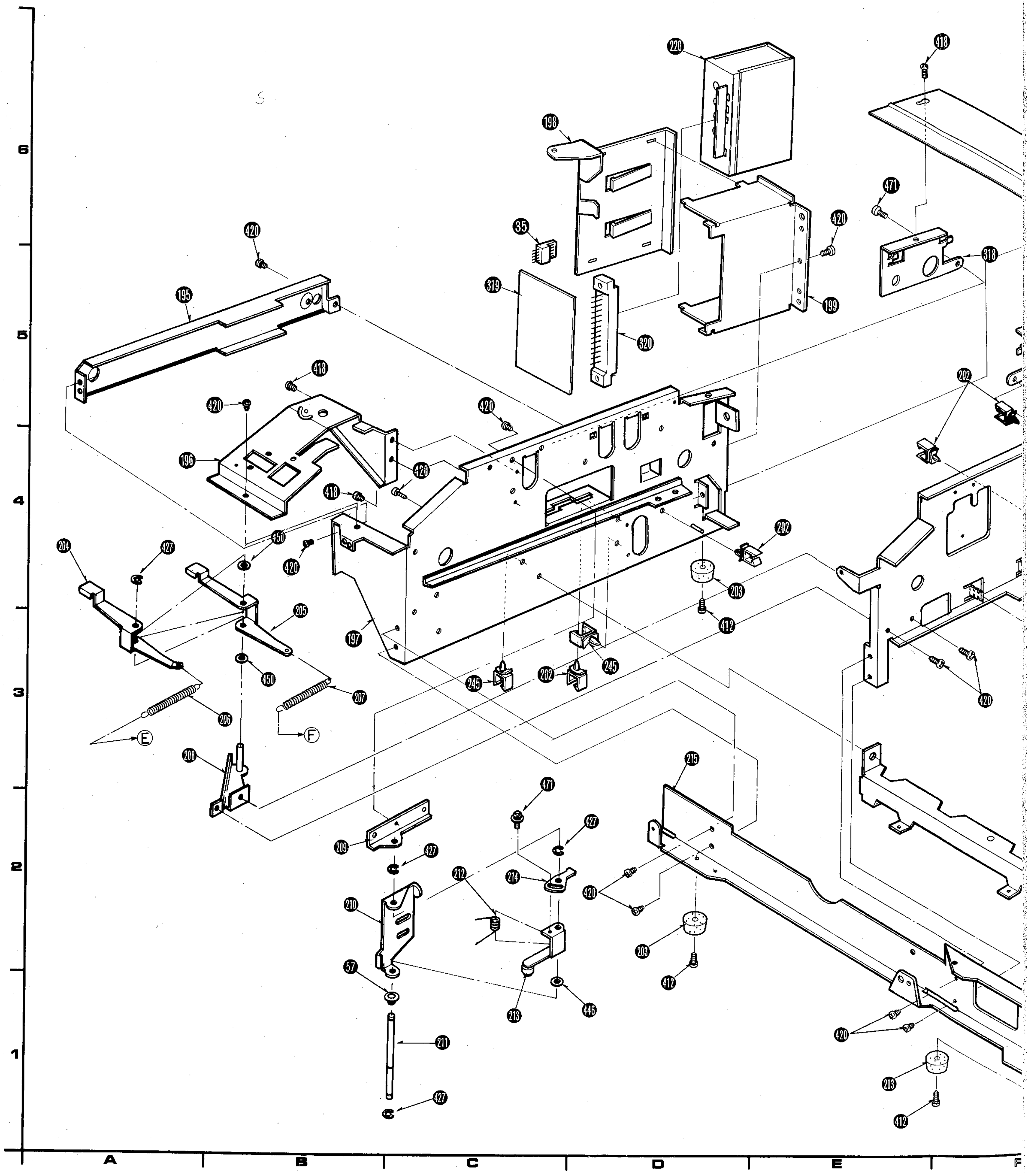
❻ *Chassis Frame Section-(1)*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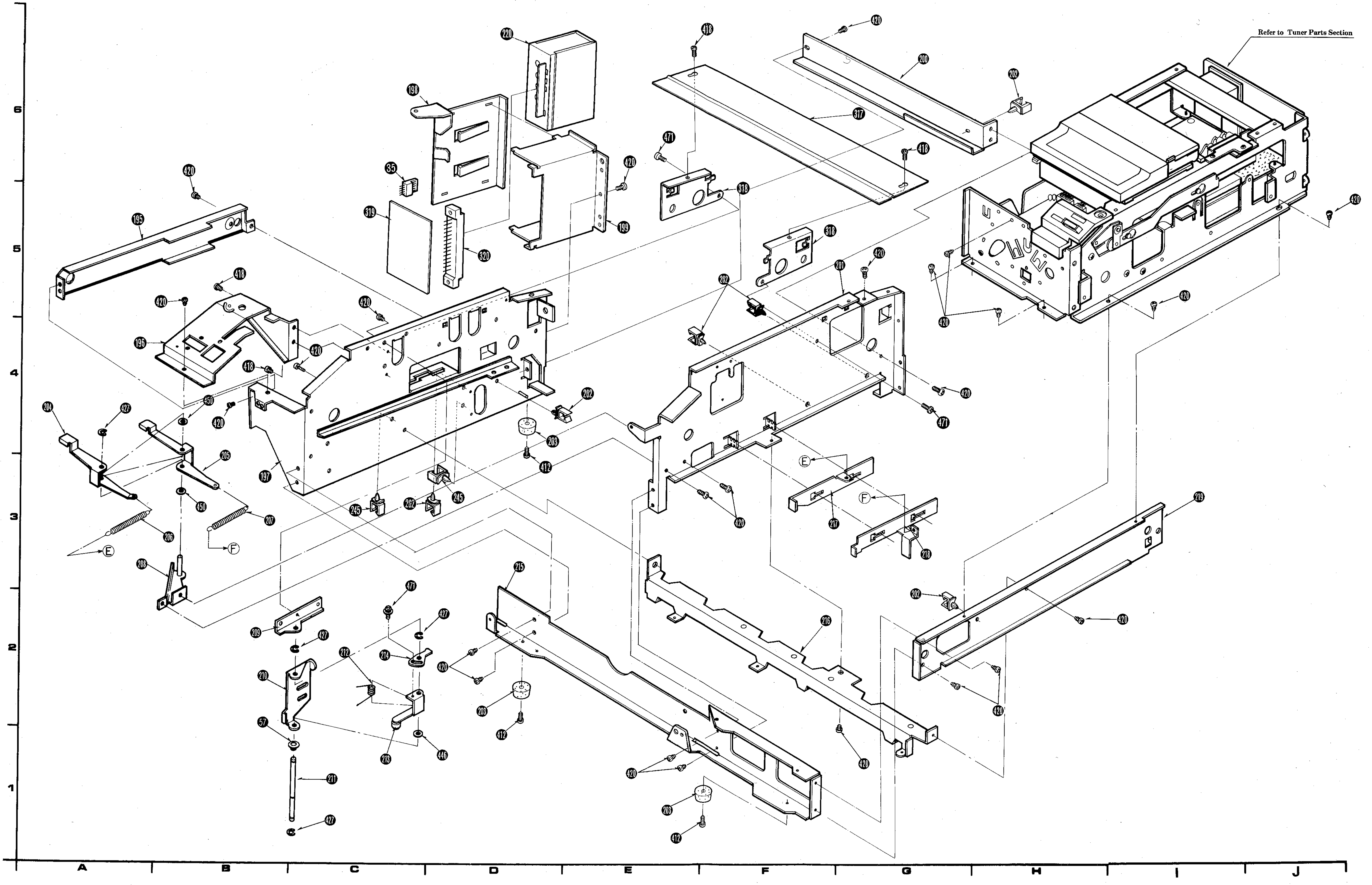
❻ *Chassis Frame Section-(1)*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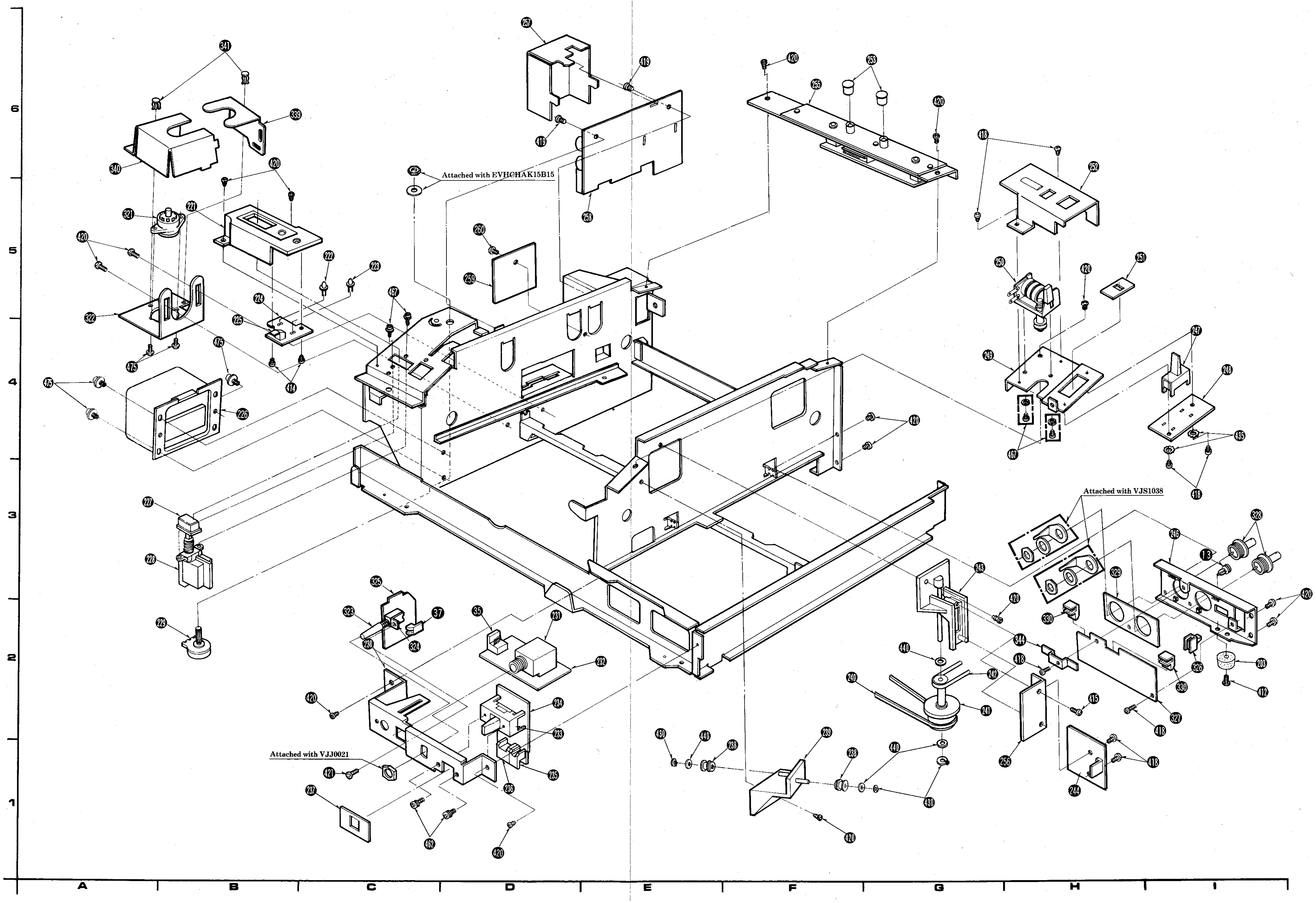
❼ *Chassis Frame Section-(2)*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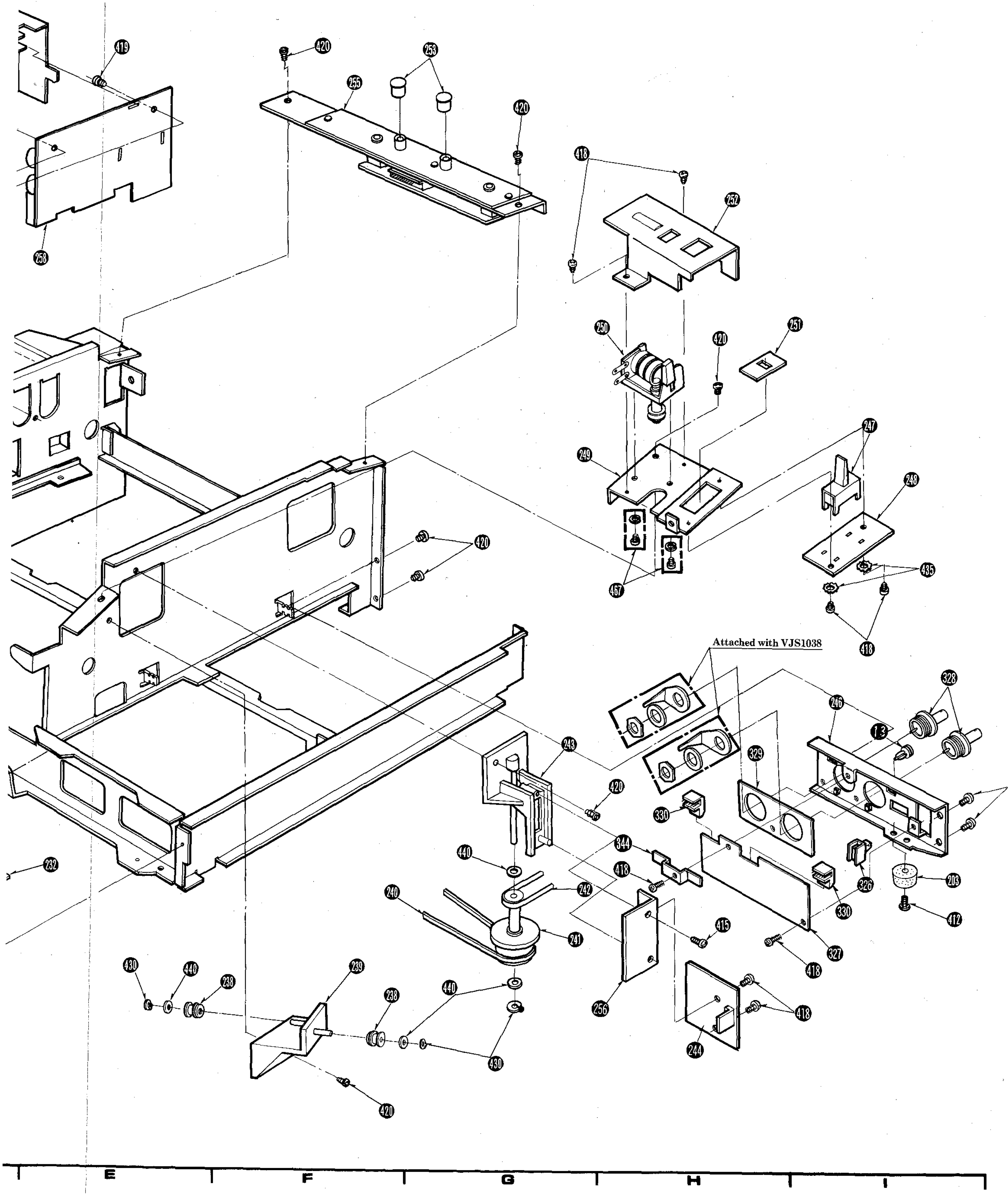
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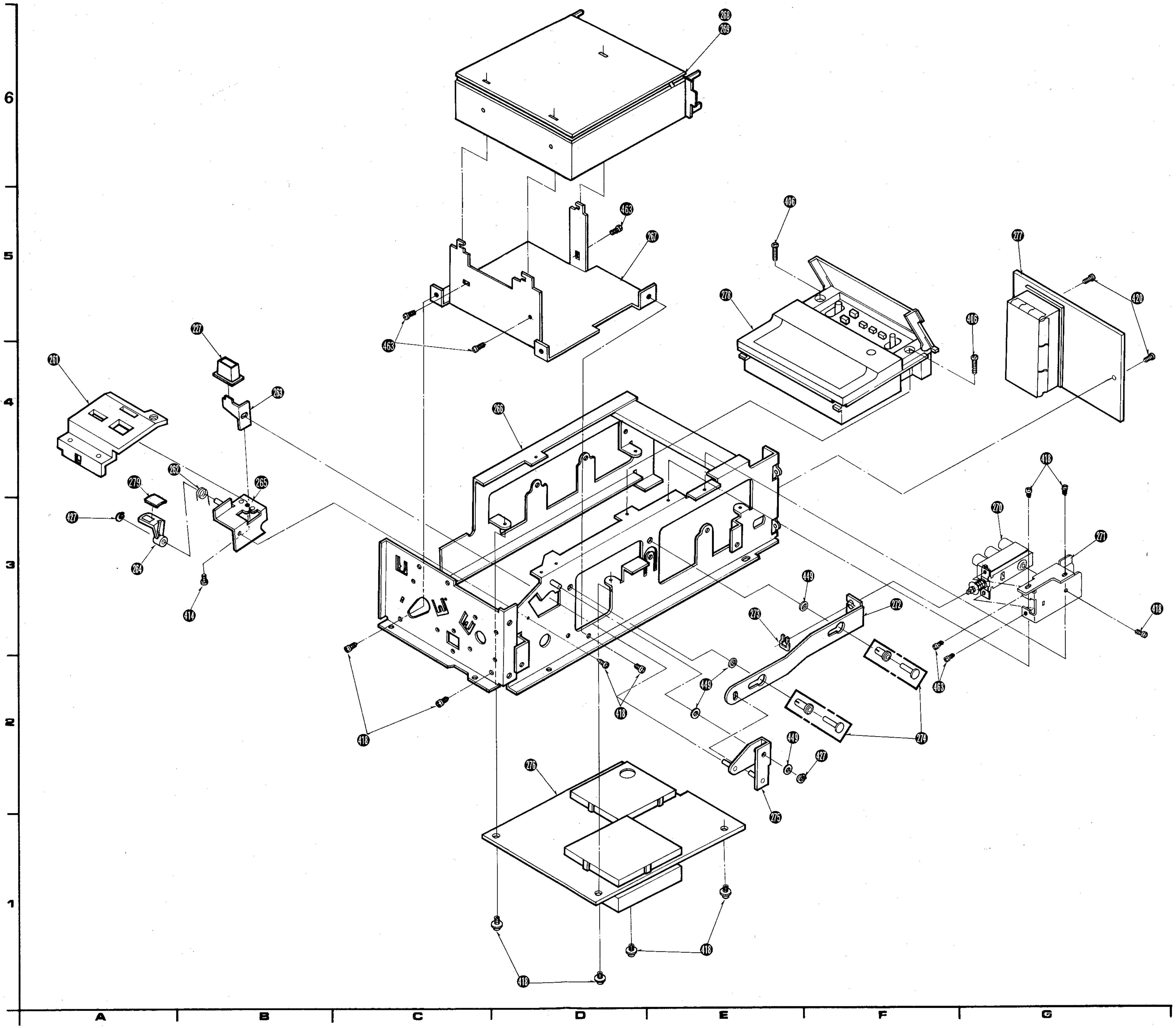
Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
13		VHN0011	Rivet	1	
35		VJP0090	5 Pin Header	1	
37		VJP0092	3 Pin Header	1	
203		VMG0172	Cushion Rubber	1	
221		VGQ0028	Power Button Panel	1	
222		GL52AR	L.E.D (Red)	1	
223		LN41YP	L.E.D (Yellow)	1	
224		VJB00170	P.C.Board	1	
225		VJP0089	3 Pin Header	1	
226		ETP66H11E	Power Transformer	1	for NV-8610E,EN,B
226		ETP66H12E	Power Transformer	1	for NV-8610EO
227		VXU0081	Switch Button Unit	1	
228		ESB70134	Power Switch	1	
229		EVHCHAK15B15	Variable Resistor	1	Tracking
230		VMA3331	Switch Angle	1	
231		VJJ0021	Mic Jack	1	
232		VJB00100	Mic Jack P.C.Board	1	
233		VST0012	Lever Switch	1	TV/CAMERA Select
234		VJB00308	P.C.Board	1	TV/CAMERA Select
235		VJP0093	5 Pin Header	1	
236		VJP0094	10 Pin Header	1	
237		VGK0441	Switch Cover A	1	
238		VDP0554	Guide Pulley	2	
239		VXA0734	Pulley Holder B Unit	1	
240		VDV0075	Counter Belt	1	
241		VXP0264	Connecting Pulley Unit	1	
242		VDV0076	Counter Belt B	1	
243		VXA0744	Pulley Holder C Unit	1	
244		VEP00298A	Reel Sensor P.C.Board Assy	1	
246		VMA3348	Rear Angle A	1	
247		VST0011	Lever Switch	1	
248		VJB00102	P.C.Board	1	
249		VMA3332	Counter Base	1	
250		VDC0014	Tape Counter	1	
251		VGK0442	Switch Cover B	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
252		VYF0076	Counter Cover Unit	1	
253		VMG0175	RCA Jack Cap	2	
255		VEK0344	Rear Jack Plate Assy	1	
256		VMA3350	Reel Sensor P.C.Board Angle	1	
257		VMZ0243	Isolation Sheet (A)	1	
258		VEP0160A	Line Filter C.B.Assy	(1)	for NV-8610E
258		VEP0160B	Line Filter C.B.Assy	(1)	for NV-8610B
259		VMZ0244	Isolation Sheet	1	
260		VHN0011	Rivet	1	
321		VJF0032	Power Voltage Selector Switch	1	for NV-8610E,EN,B
322		VMA3770	Power P. Board Angle (B)	1	for NV-8610E,EN,B
323		VGU0159	Still Knob	1	
324		ESB6020	Push Switch	1	
325		VJB00420	Sub Still P. Board	1	
326		ESD14111	Switch	1	
327		VJB00419	Rear Jack P. Board	1	
328		VJS1038	BNC Connector	2	
329		VMZ0245	Rear Jack Holder	1	
330		VJP1108	5 Pin Header	2	
339		VMZ0274	Power Selector Switch Cover (B)	1	
340		VMZ0273	Power Selector Switch Cover (A)	1	
341		VHN0111	Rivet	2	
344		VMA3801	Connector Angle	1	
412		XSN4+15S	Screw	1	
414		XTV3+10B	Tapping Screw	2	
415		XTV3+10S	Tapping Screw	1	
418		XTV3+6S	Tapping Screw	8	
419		XTV3+8RS	Tapping Screw (Red)	2	
420		XTV3+8S	Tapping Screw	15	for NV-8610E,EN,B
420		XTV3+8S	Tapping Screw	13	for NV-8610EO
421		XSN26+6FX	Screw	1	
430		XUEV2FP	Retaining Ring	3	
435		XWC3BF	Sword Tooth Washer	2	
440		XWXV2D	Polyslider Washer	4	
462		XYN26+C4	Screw w/Spring Washer	2	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
467		XYN3+C6S	Screw w/Spring Washer	4	
475		XYN4+F8S	Screw w/Spring & Flat Washer	5	for NV-8610E,EN,B
475		XYN4+F8S	Screw w/Spring & Flat Washer	3	for NV-8610EO

❽ *Tuner Parts Section*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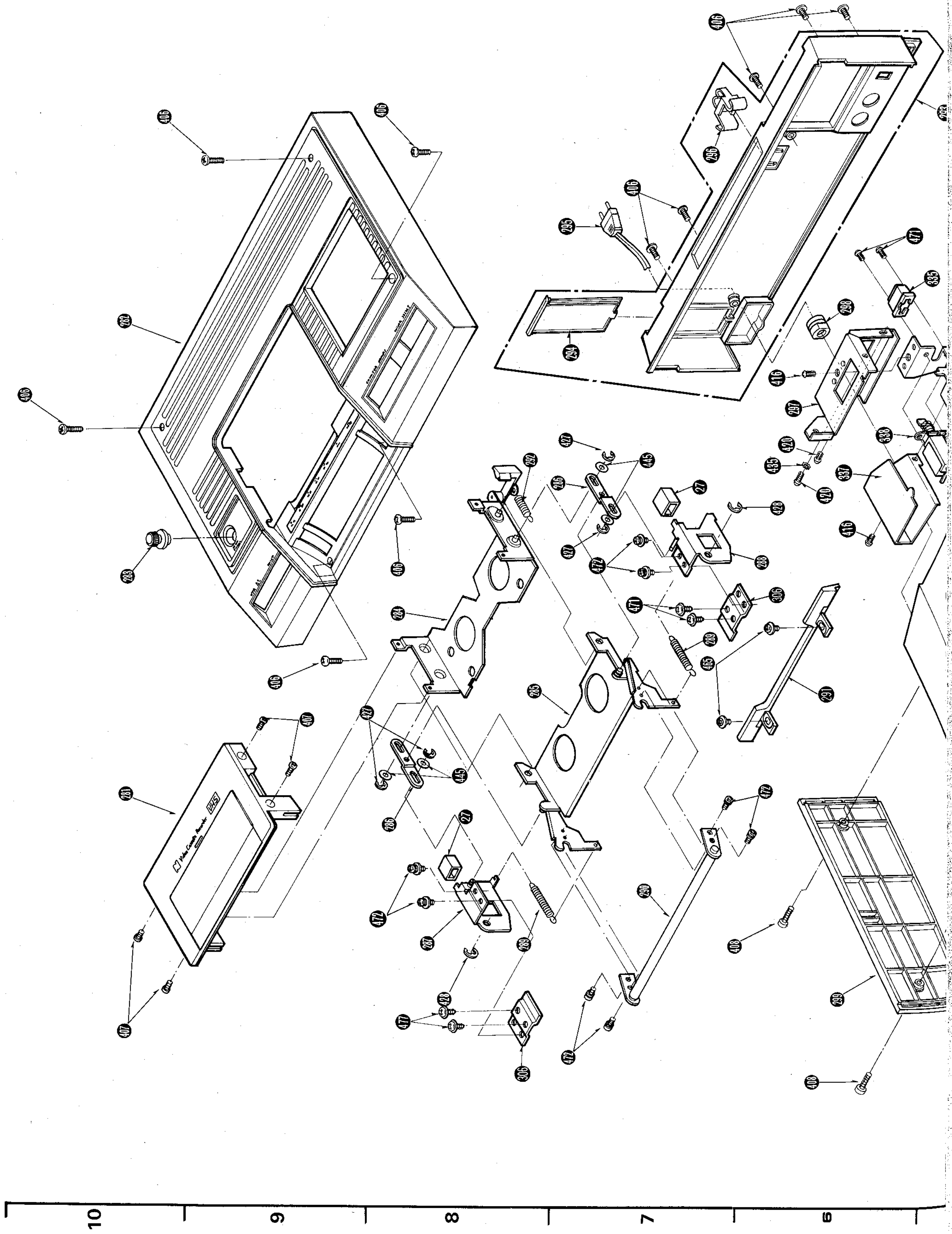
Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
227		VXU0081	Switch Button Unit	1	
261		VXA0749A	Antenna Switch Holder A Unit	1	
262		VMB0431	Antenna Indicator Spring	1	
263		ENCSLL02AD12J	Antenna Switch Lever (D)	1	
264		VML0599	Antenna Switch Indicator	1	
265		ENCBR04AD12J	Antenna Switch Base (D)	1	
266		ENCCHUA001D	Tuner Angle Unit	1	
267		ENCBRL05AD12	Tuner Mounting Angle	1	
268		TNV77401F2	Varactor Tuner	1	for NV-8610E,EN
268		TNV77432F2	Varactor Tuner	1	for NV-8610E0
268		TNV87401F2	Varactor Tuner	1	for NV-8610B
269		VEP0731A	Channel Selector C.B.Assy	(1)	for NV-8610E,EN
269		VEP0734	Channel Selector C.B.Assy	(1)	for NV-8610E0
269		VEP0718B	Channel Selector C.B.Assy	(1)	for NV-8610B
270		ESE364	Antenna Select Switch	1	
271		ENCBRL06AD12	Antenna Angle	1	
272		ENCSLL03AD12J	Antenna Switch Lever E	1	
273		VMA2640	Antenna Switch Washer	1	
274		VDB0358	Rivet	2	
275		ENCSLL04AD12J	Antenna Switch Lever F	1	
276		VEP0712D	VIF Board Assy	(1)	for NV-8610E,EN
276		VEP0712	VIF Board Assy	(1)	for NV-8610E0
276		VEP0712C	VIF Board Assy	(1)	for NV-8610B
277		ENPD704	Antenna Terminal	(1)	for NV-8610E,E0,EN
277		ENPD705	Antenna Terminal	(1)	for NV-8610B
278		VEQ0177	Timer Unit	(1)	
279		VGK0476A	Indicator Decoration Sheet	1	
406		XYNV0009	Screw	2	
414		XTV3+10B	Tapping Screw	1	
418		XTV3+6S	Tapping Screw	11	
420		XTV3+8S	Tapping Screw	2	
427		XUC3FP	Retaining Ring	2	
449		XWXV4D9	Polyslider Washer	4	
463		XYN26+C6	Screw w/Spring Washer	5	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
27		VMG0170	Stand Cushion	2	
281		VYF0149	Cassette Cover Unit	1	
282		VYP0391	Top Panel Unit	(1)	NV-8610E,E0
282		VYP0394	Top Panel Unit	(1)	NV-8610B
283		VGT43K	Tracking Knob	1	
284		VXA0837	Cassette Holder Unit	1	
285		VXA0836	Cassette Up Unit	1	
286		VML0703	Cassette Up Arm	2	
287		VXA0975	Left Stand Unit	1	
288		VXA0976	Right Stand Unit	1	
289		VMB0422	Cassette Up Spring	2	
290		VXA0724	Cassette Up Shaft Unit	1	
291		VGQ0029	Cassette Guide	1	
292		VMB0435	Release Link Spring	1	
293		VYP0393	Rear Panel Unit	1	
294		VKU0067	Rear Panel Cover	1	
295		VJA0111	Power Cord	(1)	for NV-8610E
295		VJA0112	Power Cord	(1)	for NV-8610B
296		TKK160519	Feeder Clamper	1	
297		VMA3768	AC Panel	1	
298		VJF0017	Cord Bushing	1	
299		VGP0175	Side Panel	(2)	for NV-8610E,E0
299		VGP0176	Side Panel	(2)	for NV-8610B
300		VMA2641	Front Panel Angle (A)	1	
301		VMA2642	Front Panel Angle (B)	2	
302		VMA2643	Front Panel Angle (C)	1	
303		VEQ0151S	Switchable Tuner Unit	(1)	for NV-8610E
303		VEQ0176S	Switchable Tuner Unit	(1)	for NV-8610E0
303		VEQ0152S	Switchable Tuner Unit	(1)	for NV-8610B
304		VYP0392	Front Panel Unit	1	
305		VKU0127	Bottom Plate	1	for NV-8610E,B
305		VKU0098	Bottom Plate	1	for NV-8610E0
306		VMA3504	Adjust Plate	2	
331		VYP0404	Tuner Panel Unit	1	for NV-8610E,E0
331		VYP0405	Tuner Panel Unit	1	for NV-8610B

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
332		ENCSEC03BM	Channel Panel	1	for NV-8610E
332		ENCSEC08AM	Channel Panel	1	for NV-8610EO
332		ENCSEC04BM	Channel Panel	1	for NV-8610B
334		VEK0698	Switchable Tuner	1	for NV-8610E,EO
334		VEK0699	Switchable Tuner	1	for NV-8610B
335		VXU0081	Switch Button Unit	1	
336		VMA3771	Power Switch Angle (B)	1	
337		VMZ0276	Power Switch Cover	1	
338		ESB70134	Power Switch	1	
406		XYNV0009	Screw	10	
407		XSB3+6KS	Screw	4	
408		XSB4+12KS	Screw	4	
413		XTS3+10B	Screw	3	
416		XTV3+6B	Tapping Screw	10	
419		XTV3+8RS	Tapping Screw (Red)	6	
420		XTV3+8S	Tapping Screw	2	
427		XUC3FP	Retaining Ring	4	
428		XUC4FP	Retaining Ring	2	
435		XWC3BF	Sword Tooth Washer	2	
445		XWXV4A9	Polyslider Washer	4	
465		XYNV0006	Screw w/Flat Washer	2	
470		XYNV0007	Screw w/Flat & Spring Washers		6
471		XYN3+F6S	Screw w/Flat & Spring Washers		2
472		XYN3+F8S	Screw w/Flat & Spring Washers		8
477		XYN3+F6RS	Screw w/Flat & Spring Washers		4

⑨ Casing Parts Section



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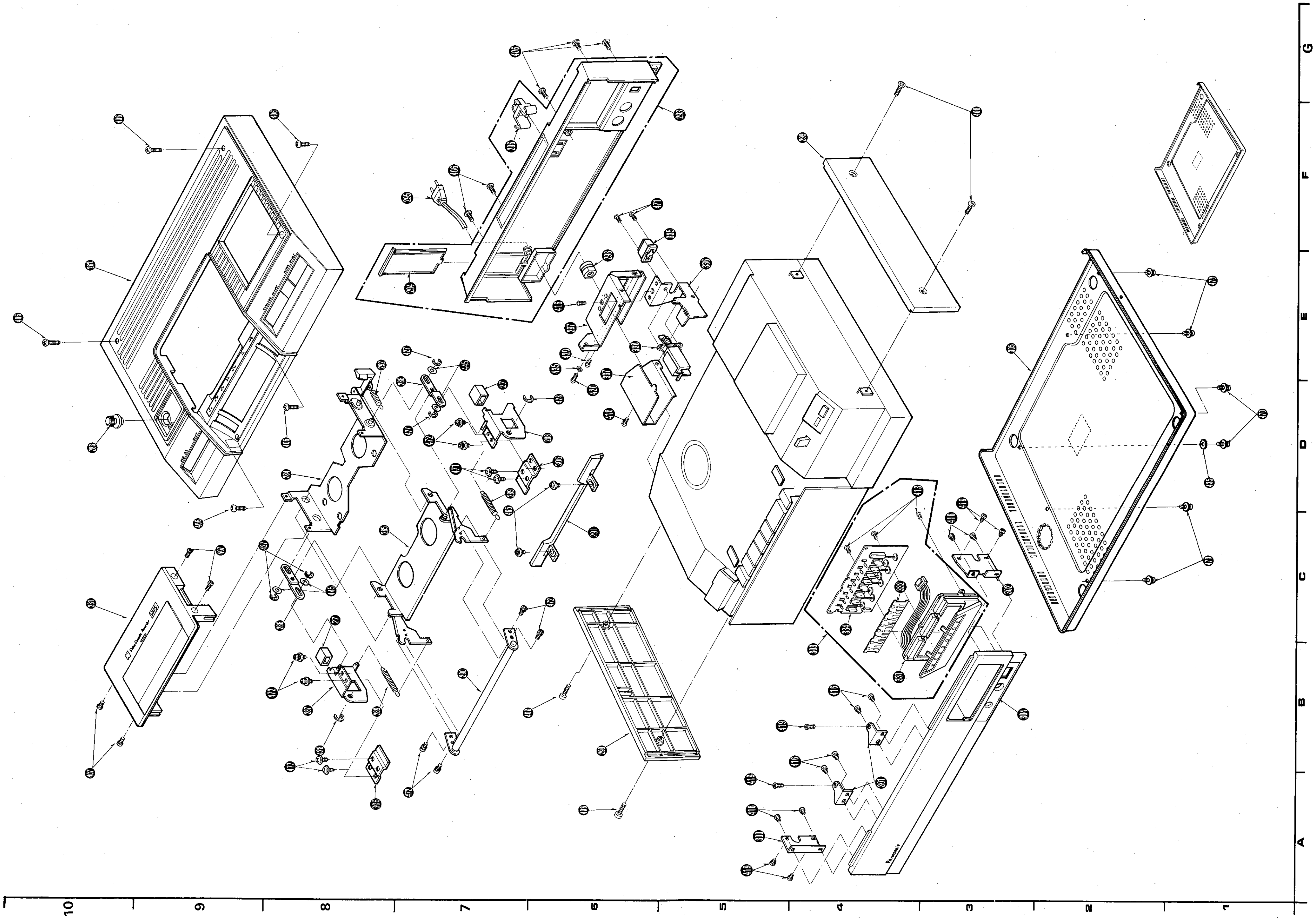
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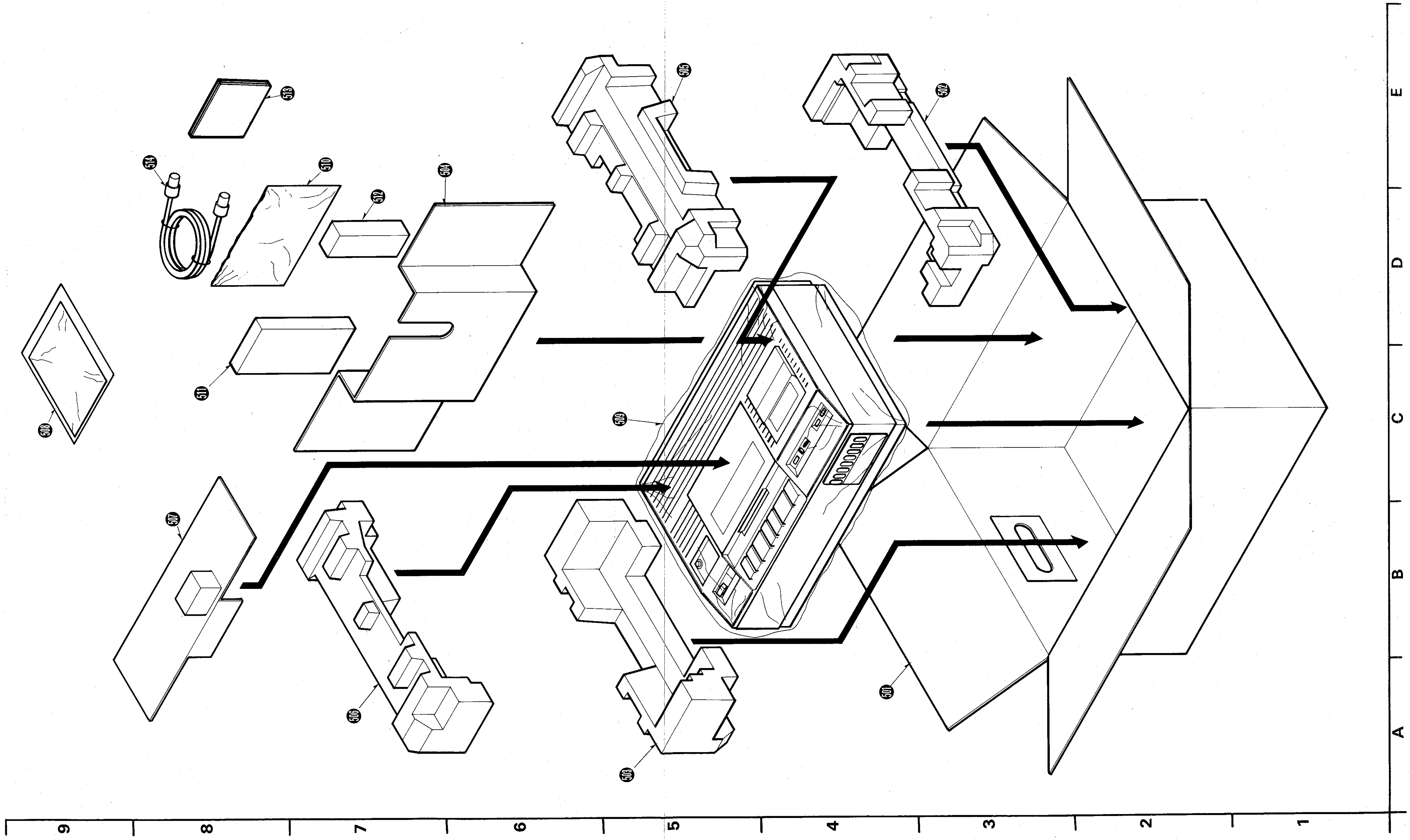
⑩ *Packaging Parts Section*



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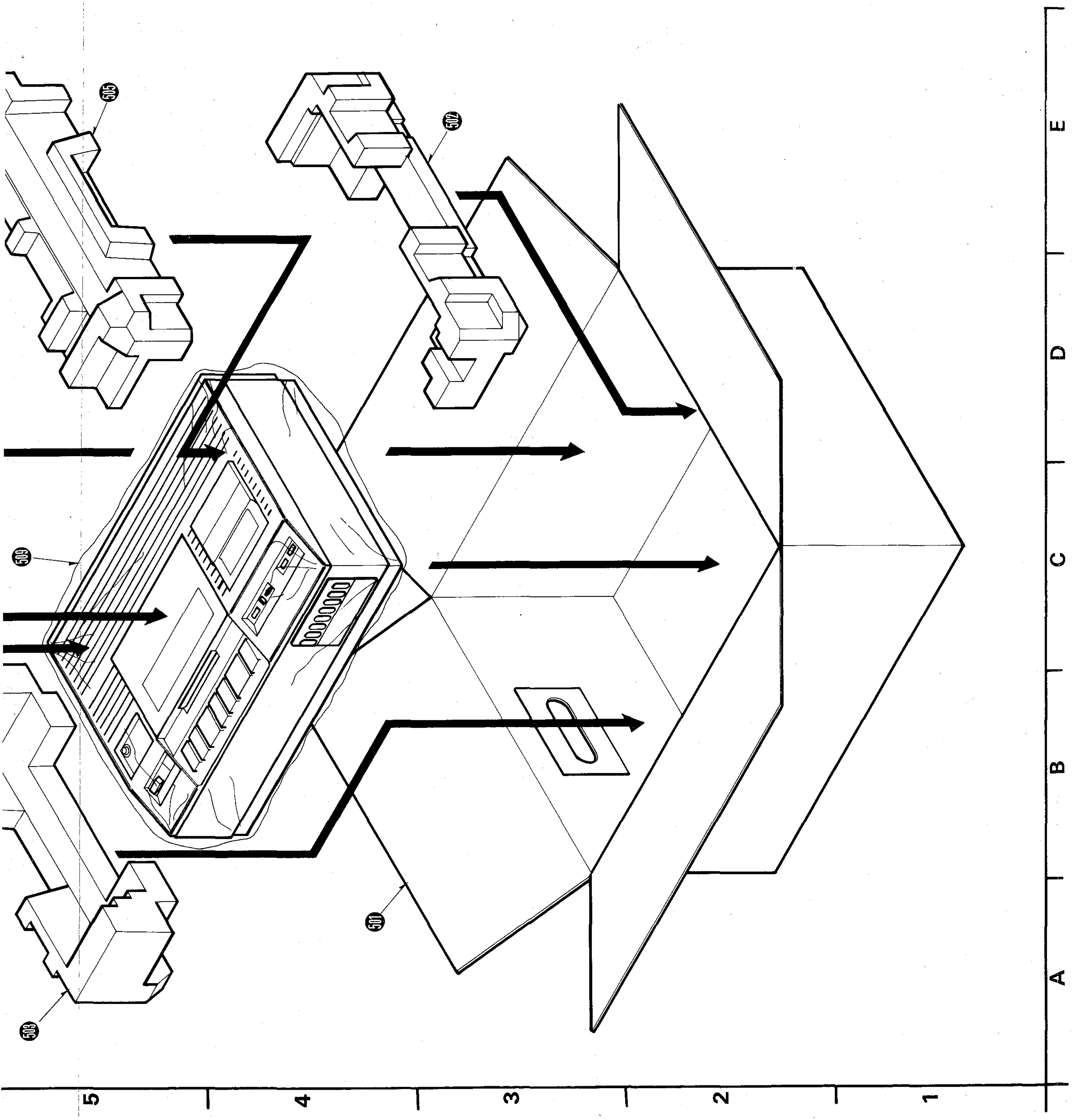

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
501		VPG0647	Packing Case	(1)	for NV-8610E
501		VPG0648	Packing Case	(1)	for NV-8610EO
501		VPG0649	Packing Case	(1)	for NV-8610B
502		VPN0416	Right Cushion (Bottom)	1	
503		VPN0417	Left Cushion (Bottom)	1	
504		VPN0381	Accessary Case	1	
505		VPN0418	Right Cushion (Top)	1	
506		VPN0419	Left Cushion (Top)	1	
507		VPN0415	Cassette Pad	1	
508		VQF0442	Fan Bag	1	
509		VPF0114	Polyethylene Bag	1	
510		VPF45	Polyethylene Bag	1	
511		NV-E120	Blank Tape	1	} Not available as service parts, please order to sales section.
512		NV-A181Z	Remote Control Unit	1	
513		VYC0028	Dust Cover	1	
514		VJA0130	DIN-DIN Coaxial Cable	1	

MECHANICAL REPLACEMENT PARTS LIST

Model No. NV-8610-E/-B/-EO

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
1(1)	VEG0140	D.D Cylinder Unit	1	
2(1)	VEH0099	Upper Cylinder Unit	1	
3(1)	VMA3165	Wire Cover	1	
4(1)	VXA0869	Brush Angle Unit	1	
5(1)	VUK4015	Loading Base Unit	1	
6(1)	VMB0535	Leaf Spring	1	
7(1)	VRH0004	Heater Unit	1	
8(1)	VXP0239A	Roller Post Unit	2	
9(1)	VXA0853	Inclined Base A Unit	1	
10(1)	VXA0856	Shaft Holder A Unit	1	
11(1)	VXA1024	Loading Ring A Unit	1	
12(1)	VXA0923	Loading Ring B Unit	1	
13(1)	VMX0205	Spring Stopper	1	
13(7)	VHN0011	Rivet	1	
14(1)	VMB0531	Head Arm Spring	1	
15(1)	VMA2560	Shaft Holder Spring	2	
16(1)	VMA3106	Protector S	2	
17(1)	VBR0031	Audio/Control Head	1	
18(1)	VHD0032	Adjust Screw	1	
19(1)(5)	VMB0404	Adjust Spring	2	
20(1)	VMA2553	Head Base B	1	
21(1)	VMD0075	Head Base F	1	
22(1)	VSC0348	Ground Plate	1	
23(1)	VXA0854	Inclined Base B Unit	1	
24(1)	VXA0855	Shaft Holder B Unit	1	
25(1)	XAMV0019	Sensor Lamp	1	
26(1)	VXA0731	Lamp Bracket Unit	1	
27(1)(9)	VMG0170	Stand Cushion	3	
28(1)	VDP0663	Panel Support	1	
29(1)	VXP0247	Inertia Roller Arm Unit	2	
30(1)(3)	VMB0418	Inertia Roller Spring	3	
31(1)	VMX0203	Limiter Cap	1	
32(1)	VMX0186	Post Sleeve	2	
33(1)	VMB0478	Post Spring	1	
34(1)	VJB00460	A/C Head P.C.Board	1	
35(1)(6)(7)	VJP0090	5 Pin Header	3	
36(1)	VML0571	Switch Link	2	
37(1)(4)(5) (7)	VJP0092	3 Pin Header	6	
38(1)	QSB0234	Leaf Switch	2	
39(1)	VXA0947	Switch Bracket Unit	1	
40(1)	VDP0546	Loading Roller	2	
41(1)	VBS0014	Full Erase Head	1	
42(1)	VXK0322	Erase Head Base Unit	1	
43(1)	VMX0121	Cassette Support	1	
44(1)	VML0735	Charging Link	1	
45(1)	VMB0569	Charging Link Spring	1	
45(2)	VMB0399	Play Arm Spring A	1	
46(1)	VMX0139	Spacer	1	
47(1)	VXA0705	Roller Bracket A Unit	1	
49(1)	VXA0706	Roller Bracket B Unit	1	
50(1)	VDP0692	Loading Roller B	4	
51(1)	VMB0532	Post Spring	1	
52(2)	VMB0410	Play Lever Spring	2	
53(4)	VMA3355	Lock Plate (C)	1	
54(2)	VXZ0055	Brake B Unit	1	
55(2)	VMB0414	Brake Arm Spring	1	
56(2)	VML0551	F.F Slide Lever	1	
57(2)(6)	VMX0122	Slide Washer A	16	
58(2)	VML0550	Check Slide Lever	1	
59(2)	VML0549	REW Slide Lever	1	
60(2)	VML0810	Charge Slide Lever B	1	
61(2)	VXL0578	Charge Slide Lever A Unit	1	
62(2)	VML0553	F.F Lever	1	
63(2)	VML0730	Play Slide Lever	1	
64(2)	VML0853	REC Slide Lever A	1	
65(2)	VML0552	REW Lever	1	
66(2)	VMB0409	Eject Lever Spring	1	
67(2)	VML0805	Eject Lever	1	
68(2)	VML0555	Safety Link	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
69(2)		VMB0398	Rewind Arm Spring	2	
70(2)		VXP0244	Main Pulley Unit	1	
71(2)		VDV0103	Reel Belt (E)	1	
72(2)		VXP0265	Two Step Pulley Unit	1	
73(2)		VML0545	Soft Brake Unit	1	
74(2)		VML0725	Action Lever	1	
75(2)		VXL0456	F.F Arm Unit	1	
76(2)		VMB0401	F.F Arm Unit	1	
77(2)(5)		VMA2543	Spring Hook	2	
78(2)		VXP0245	F.F Idler Unit	1	
79(2)		VMB0423	Lock Spring	1	
80(2)		VMB0430	Return Spring B	1	
81(2)		VXL0559	Pause Slide Lever (1) Unit	1	
82(2)		VML0590	Cycle Plate	1	
83(2)		VMB0428	Cycle Plate Spring	1	
84(2)(3)		VMA2568	Transistor Holder	2	
85(2)		VJB00183	Takeup Sensor P.C.Board	1	
86(2)(3)		PN150NV	Photo Transistor	2	
87(2)		VXA0849	Cassette Opener Unit	1	
88(2)		VMB0533	Play Arm Spring B	1	
89(2)		VML0727	Play Arm (B)	1	
90(2)		VXP0243	Play Idler Unit	1	
91(2)		VML0530	Sub Play Arm	1	
92(2)		VXZ0051	Sub Tension Arm B Unit	1	
93(2)(3)		VDP0543	Sub Roller A	2	
94(2)		VXL0405	Rewind Arm Unit	1	
95(2)		VXP292	Rewind Roller Unit	1	
96(2)(5)		VMX0157	Thrust Washer	3	
97(2)		VML0554	Connecting Link	1	
98(1)		VJB00310	Leaf Switch P.C.Board	1	
101(3)		VXL0573	Band Release Lever (1) Unit	1	
102(3)		VMA3365	Tension Spring Hook	1	
103(3)		VMA3364	Cassette Stud Base	1	
104(3)		VMB0529	Release Lever Spring	1	
105(3)		VXL0576	Tension Arm Unit	1	
106(3)		VMB0530	Tension Spring	1	
107(3)		VXZ0056	Tension Band Unit	1	
108(3)		VXK0301	Tension Arm Base Unit	1	
109(3)		VXL0575	Loading Tension Arm Unit	1	
110(3)		VMB0528	Release Lever Spring	1	
111(3)(4)		VXU0113	Function Button Unit	2	
112(3)		VXR0064	Supply Reel Table Unit	1	
113(3)		VDB0364	Thrust Bearing	1	
114(3)		VXR0065	Takeup Reel Table Unit	1	
115(3)		VMX0146	Spacer	1	
116(3)		VMA3435	Transistor Bracket	1	
117(3)		VJB00132	Supply Sensor P.C.Board	1	
118(3)		VEK0494	Capstan Motor C.B.Assy	1	
119(3)		VEM0099	Capstan Motor Unit	1	
120(3)		VDP0552	Cassette Lock Roller	2	
121(3)		VXL0580	Cassette Lock Arm A Unit	1	
122(3)		VMS1314	Lock Roller Pin	4	
123(3)		VMA2585	Cassette Stud A	1	
124(3)		VXL0557	Cassette Lock Arm B Unit	1	
125(3)		VMA2586	Cassette Stud B	1	
126(3)		VML0806	Connect Lever	1	
127(3)		VMB0560	Loading Tension Spring	1	
130(4)		VMA3360	Lock Release	1	
131(4)		VXA0875	Release Plate Unit	1	
132(4)		VSJ0038	Stop Mode Solenoid	1	
133(4)		VMA3702	Lock Release Spring	1	
134(4)		VMA3370	Spring Holder	1	
135(4)		VMA3371	Button Spring	1	
136(4)		VMA3354	Lock Plate (B)	1	
137(4)		VJB00340	Stop Solenoid P.C.Board	1	
138(4)		VMB0538	Slide Lever Spring	1	
139(4)		VMA3358	Slide Lever (A)	4	
140(4)		VMA3359	Slide Lever (B)	1	
141(4)		VXU0117	Button (C) Unit	2	
143(4)		VXU0129	Button (A) Unit	5	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
144(4)		VXU0137	Button (B) Unit	1	
145(5)		VDV0074	Loading Belt	1	
146(5)		VEM0074	Loading Motor Pulley Unit	1	
147(5)		VDP0614	Loading Gear (A)	1	
148(5)		VMS1349	Worm Wheel Shaft	1	
149(5)		VDP0549	Loading Gear	1	
150(5)		VMS1303	Gear Shaft (A)	1	
151(5)		VXA0858	Loading Motor Bracket Unit	1	
152(5)		VDP0615	Worm Wheel	1	
154(5)		VJB00172	Loading Motor P.C.Board	1	
156(5)		VJR3	Wire Clamper	5	
157(5)		VDB0351	Loading Metal	1	
158(5)		VDB0371	Thrust Bearing	1	
159(5)		VXP0198	Loading Pulley Unit	1	
160(5)		VMF0124	Clutch Felt	1	
161(5)		VME0024	Friction Sheet	1	
162(5)		VDP0561	Loading Pulley	1	
163(5)		VMB0432	Clutch Spring C	1	
164(5)		VDP0562	Clutch Pulley D	1	
165(5)		VMA2598	Micro Switch Bracket	1	
166(5)		VMA5377	Micro Switch Fiber	1	
167(5)		VSM0027	Micro Switch	1	
168(5)		VMB0534	Leaf Spring	1	
169(5)		VJB00309	Micro Switch P.C.Board	1	
170(5)		ECEA50N1E	Capacitor	1	
171(5)		VDV0092	Reel Belt B	1	
172(5)		VDP0622	Intermediate Pulley	1	
173(5)		VXP0261	Capstan Shaft (N) Unit	1	
174(5)		VDV0094A	Capstan Belt	(1)	Select one of these
174(5)		VDV0094B	Capstan Belt	(1)	
174(5)		VDV0094C	Capstan Belt	(1)	
175(5)		VXA0872	Thrust Holder Unit	1	
176(5)		VMX0123	Oil Cap	1	
177(5)		VMT0022	Oil Pool	1	
178(5)		VXD0032	Capstan Holder Unit	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
179(5)		VXP0234	Pressure Roller Arm Unit	1	
180(5)		VMB0403	Return Spring	1	
181(5)		VXL0540	Main Pressure Arm Unit	1	
182(5)		VXL0459	Connecting Lever (A) Unit	1	
183(5)		VMX0147	Spacer	1	
184(5)		VML0537	Spring Hook Lever	1	
185(5)		VXL0552	Connecting Lever (B) Unit	1	
186(5)		VMA2545	Solenoid Bracket	1	
187(5)		VML0534	Solenoid Lever	1	
188(5)		VSJ0036	Pressure Roller Solenoid	1	
189(5)		VMA2546	Spring Hook Angle	1	
190(5)		VMB0405	Pressure Lever Spring	1	
191(5)		VXL0579	Control Pulley Unit	1	
192(5)		VDV0102	Control Belt	1	
195(6)		VMA3333	Left Handle	1	
196(6)		VMA3342	Power Switch Angle	1	
197(6)		VMA3589	Left Side Frame	1	
198(6)		VMA3335	RF Converter Guide Cover	1	
199(6)		VMA3334	RF Converter Guide	1	
200(6)		VMA3328	Rear Frame	1	
201(6)		VMA3326	Center Frame	1	
202(6)		VJF0004	Lead Clamper (Large)	5	
203(6)(7)		VMG0172	Cushion Rubber	4	
204(6)		VML0567	Audio Switch Link	1	
205(6)		VML0568	Servo Switch Link	1	
206(6)		VMB0563	Audio Lever Spring	1	
207(6)		VMB0564	Servo Lever Spring	1	
208(6)		VXA0717	Link Bracket Unit	1	
209(6)		VMA2685	Shaft Guide Angle	1	
210(6)		VML0584	Cassette Lock Lever	1	
211(6)		VMS1112	Lock Shaft	1	
212(6)		VMB0427	Eject Link Spring	1	
213(6)		VXL0481	Eject Link A Unit	1	
214(6)		VMA3362	Eject Link B	1	
215(6)		VMA3322	Front Angle	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
216(6)		VMA3329	Center Angle	1	
217(6)		VML0801	Audio Slide Lever	1	
218(6)		VML0802	Servo Slide Lever	1	
219(6)		VMA3330	Right Side Angle	1	
220(6)		ENC17319	RF Converter	(1)	for NV-8610E,EO
220(6)		ENC17318	RF Converter	(1)	for NV-8610B
220(6)		ENC17206	RF Converter	(1)	for NV-8610EN
221(7)		VGQ0028	Power Button Panel	1	
222(7)		GL52AR	L.E.D (Red)	1	
223(7)		LN41YP	L.E.D (Yellow)	1	
224(7)		VJB00170	P.C.Board	1	
225(1)(7)		VJP0089	3 Pin Header	2	
226(7)		ETP66H11E	Power Transformer	1	for NV-8610E,EN,B
226(7)		ETP66H12E	Power Transformer	1	for NV-8610EO
227(7)(8)		VXU0081	Switch Button Unit	2	
228(7)		ESB70134	Power Switch	1	
229(7)		EVHCHAK15B15	Variable Resistor	1	Tracking
230(7)		VMA3331	Switch Angle	1	
231(7)		VJJ0021	Mic Jack	1	
232(7)		VJB00100	Mic Jack P.C.Board	1	
233(7)		VST0012	Lever Switch	1	TV/CAMERA Select
234(7)		VJB00308	P.C.Board	1	TV/CAMERA Select
235(7)		VJP0093	5 Pin Header	1	
236(7)		VJP0094	10 Pin Header	1	
237(7)		VGK0441	Switch Cover A	1	
238(7)		VDP0554	Guide Pulley	2	
239(7)		VXA0734	Pulley Holder B Unit	1	
240(7)		VDV0075	Counter Belt	1	
241(7)		VXP0264	Connecting Pulley Unit	1	
242(7)		VDV0076	Counter Belt B	1	
243(7)		VXA0744	Pulley Holder C Unit	1	
244(7)		VEP00298A	Reel Sensor P.C.Board Assy	1	
245(6)		VJF0022	Lead Clamper	2	
246(7)		VMA3348	Rear Angle A	1	
247(7)		VST0011	Lever Switch	1	
248(7)		VJB00102	P.C.Board	1	
249(7)		VMA3332	Counter Base	1	
250(7)		VDC0014	Tape Counter	1	
251(7)		VGK0442	Switch Cover B	1	
252(7)		VYF0076	Counter Cover Unit	1	
253(7)		VMG0175	RCA Jack Cap	2	
255(7)		VEK0344	Rear Jack Plate Assy	1	
256(7)		VMA3350	Reel Sensor P.C.Board Angle	1	
257(7)		VMZ0243	Isolation Sheet (A)	1	
258(7)		VEP0160A	Line Filter C.B.Assy	(1)	for NV-8610E
258(7)		VEP0160B	Line Filter C.B.Assy	(1)	for NV-8610B
259(7)		VMZ0244	Isolation Sheet	1	
260(7)		VHN0011	Rivet	1	
261(8)		VXA0749A	Antenna Switch Holder A Unit	1	
262(8)		VMB0431	Antenna Indicator Spring	1	
263(8)		ENCSLL02AD12J	Antenna Switch Lever (D)	1	
264(8)		VML0599	Antenna Switch Indicator	1	
265(8)		ENCBR04AD12J	Antenna Switch Base (D)	1	
266(8)		ENCCHUA001D	Tuner Angle Unit	1	
267(8)		ENCBRL05AD12	Tuner Mounting Angle	1	
268(8)		TNV77401F2	Varactor Tuner	1	for NV-8610E,EN
268(8)		TNV77432F2	Varactor Tuner	1	for NV-8610EO
268(8)		TNV87401F2	Varactor Tuner	1	for NV-8610B
269(8)		VEP0731A	Channel Selector C.B.Assy	(1)	for NV-8610E,EN
269(8)		VEP0734	Channel Selector C.B.Assy	(1)	for NV-8610EO
269(8)		VEP0718B	Channel Selector C.B.Assy	(1)	for NV-8610B
270(8)		ESE364	Antenna Select Switch	1	
271(8)		ENCBRL06AD12	Antenna Angle	1	
272(8)		ENCSLL03AD12J	Antenna Switch Lever E	1	
273(8)		VMA2640	Antenna Switch Washer	1	
274(8)		VDB0358	Rivet	2	
275(8)		ENCSLL04AD12J	Antenna Switch Lever F	1	
276(8)		VEP0712D	VIF Board Assy	(1)	for NV-8610E,EN
276(8)		VEP0712	VIF Board Assy	(1)	for NV-8610EO
276(8)		VEP0712C	VIF Board Assy	(1)	for NV-8610B

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
277(8)		ENPD704	Antenna Terminal	(1)	for NV-8610E,EO,EN
277(8)		ENPD705	Antenna Terminal	(1)	for NV-8610B
278(8)		VEQ0177	Timer Unit	(1)	
279(8)		VGK0476A	Indicator Decoration Sheet	1	
281(9)		VYF0149	Cassette Cover Unit	1	
282(9)		VYP0391	Top Panel Unit	(1)	for NV-8610E,EO
282(9)		VYP0394	Top Panel Unit	(1)	for NV-8610B
283(9)		VGT43K	Tracking Knob	1	
284(9)		VXA0837	Cassette Holder Unit	1	
285(9)		VXA0836	Cassette Up Unit	1	
286(9)		VML0703	Cassette Up Arm	2	
287(9)		VXA0975	Left Stand Unit	1	
288(9)		VXA0976	Right Stand Unit	1	
289(9)		VMB0422	Cassette Up Spring	2	
290(9)		VXA0724	Cassette Up Shaft Unit	1	
291(9)		VGQ0029	Cassette Guide	1	
292(9)		VMB0435	Release Link Spring	1	
293(9)		VYP0393	Rear Panel Unit	(1)	
294(9)		VKU0067	Rear Panel Cover	1	
295(9)		VJA0111	Power Cord	(1)	for NV-8610E
295(9)		VJA0112	Power Cord	(1)	for NV-8610B
296(9)		TKK160519	Feeder Clamper	1	
297(9)		VMA3768	AC Panel	1	
298(9)		VJF0017	Cord Bushing	1	
299(9)		VGP0175	Side Panel	(2)	for NV-8610E,EO
299(9)		VGP0176	Side Panel	(2)	for NV-8610B
300(9)		VMA2641	Front Panel Angle (A)	1	
301(9)		VMA2642	Front Panel Angle (B)	2	
302(9)		VMA2643	Front Panel Angle (C)	1	
303(9)		VEQ0151S	Switchable Tuner Unit	(1)	for NV-8610E
303(9)		VEQ0176S	Switchable Tuner Unit	(1)	for NV-8610EO
303(9)		VEQ0152S	Switchable Tuner Unit	(1)	for NV-8610B
304(9)		VYP0392	Front Panel Unit	1	
305(9)		VKU0127	Bottom Plate	1	for NV-8610E,B
305(9)		VKU0098	Bottom Plate	1	for NV-8610EO

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
306(9)		VMA3504	Adjust Plate	2	
311(1)		VRT0004	Thermo Switch	1	
312(1)		VJB00341	Thermo Switch P. Board	1	
313(2)		VDP0718	Brake Roller	1	
314(2)		VMG0199	Brake Roller Rubber	1	
315(2)		VML0927	Brake Arm	1	
316(2)		VML0548	REC Slide Lever B	1	
317(6)		VSC0413	Shield Case P	1	
318(6)		VMA3532	Shield Case Holder	2	
319(6)		VJB00312	Edge Connector P.C.Board	1	
320(6)		VJS1072	Edge Connector	1	
321(7)		VJF0032	Power Voltage Selector Switch	1	for NV-8610E,EN,B
322(7)		VMA3770	Power P.C.Board Angle (B)	1	for NV-8610E,EN,B
323(7)		VGU0159	Still Knob	1	
324(7)		ESB6020	Push Switch	1	
325(7)		VJB00420	Sub Still P.C.Board	1	
326(7)		ESD14111	Switch	1	
327(7)		VJB00419	Rear Jack P.C.Board	1	
328(7)		VJS1038	BNC Connector	2	
329(7)		VMZ0245	Rear Jack Holder	1	
330(7)		VJP1108	5 Pin Header	2	
331(9)		VYP0404	Tuner Panel Unit	1	for NV-8610E,EO
331(9)		VYP0405	Tuner Panel Unit	1	for NV-8610B
332(9)		ENCSEC03BM	Channel Panel	1	for NV-8610E
332(9)		ENCSEC08AM	Channel Panel	1	for NV-8610EO
332(9)		ENCSEC04BM	Channel Panel	1	for NV-8610B
334(9)		VEK0698	Switchable Tuner	1	for NV-8610E,EO
334(9)		VEK0699	Switchable Tuner	1	for NV-8610B
335(9)		VXU0081	Switch Button Unit	1	
336(9)		VMA3771	Power Switch Angle (B)	1	
337(9)		VMZ0276	Power Switch Cover	1	
338(9)		ESB70134	Power Switch	1	
339(7)		VMZ0274	Power Selector Switch Cover (B)	1	
340(7)		VMZ0273	Power Selector Switch Cover (A)	1	
341(7)		VHN0111	Rivet	2	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
342(2)		VMD0011	Dew Detector Bracket	1	
343(2)		VSQ0054	Dew Detector	1	
401(5)		XNG3	Nut	1	
402(1)		XNG4	Nut	2	
405(5)		XRHV3XB	Rivet	1	
406(8)(9)		XYNV0009	Screw	12	
407(9)		XSB3+6KS	Screw	4	
408(9)		XSB4+12KS	Screw	4	
409(5)		XSN3+12S	Screw	1	
410(1)		XSN3+6S	Screw	2	
411(1)		XSN3+8S	Screw	1	
412(6)(7)		XSN4+15S	Screw	4	
413(9)		XTS3+10B	Screw	3	
414(7)(8)		XTV3+10B	Tapping Screw	3	
415(2)(7)		XTV3+10S	Tapping Screw	2	
416(9)		XTV3+6B	Tapping Screw	10	
417(1)		XTV3+6RS	Tapping Screw	2	
418(1)(3)(5)		XTV3+6S	Tapping Screw	32	
(6)(7)(8)					
419(5)(7)(9)		XTV3+8RS	Tapping Screw (Red)	11	
420(1)(2)(3)		XTV3+8S	Tapping Screw	68	
(5)(6)(8)					
(9)					
420(7)		XTV3+8S	Tapping Screw	15	for NV-8610E,EN,B
420(7)		XTV3+8S	Tapping Screw	13	for NV-8610EO
421(7)		XSN26+6FX	Screw	1	
425(2)(5)		XUC2FP	Retaining Ring	2	
426(1)(2)(3)		XUC25FP	Retaining Ring	10	
(5)					
427(1)(2)(3)		XUC3FP	Retaining Ring	20	
(5)(6)(8)					
(9)					
428(5)(9)		XUC4FP	Retaining Ring	3	
429(5)		XUC5FP	Retaining Ring	2	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
430(7)		XUEV2FP	Retaining Ring	3	
431(3)(4)(5)		XUEV3FP	Retaining Ring	3	
432(1)(2)(3)		XUEV4FP	Retaining Ring	22	
(5)					
433(5)		XVE3A6S	Hex Holde Screw	3	
434(5)		XWA3	Spring Washer	3	
435(1)(2)(3)		XWC3BF	Sword Tooth Washer	10	
(5)(7)(9)					
436(4)		XWG3F8	Flat Washer	2	
437(2)		XUEV2FP	Retaining Ring	2	
440(7)		XWXV2D	Polyslider Washer	4	
441(1)(2)(5)		XWXV3D	Polyslider Washer	6	
442(2)(3)(5)		XWXV3D54	Polyslider Washer	8	
443(4)		XWXV3D6	Polyslider Washer	1	
444(3)		XWXV4A65	Polyslider Washer	2	
445(9)		XWXV4A9	Polyslider Washer	4	
446(6)		XWXV4D	Polyslider Washer	1	
447(3)(5)		XWXV4D65	Polyslider Washer	3	
448(5)		XWXV4D7	Polyslider Washer	3	
449(1)(2)(3)		XWXV4D9	Polyslider Washer	33	
(8)					
450(6)		XWXV4F9	Polyslider Washer	2	
451(3)		XWXV4Z65	Polyslider Washer	2	
452(5)		XWXV5	Polyslider Washer	1	
453(1)		XXE2D2FP	Setscrew	2	
455(1)		XXE3A6	Setscrew	2	
456(1)		XXE3D4KS	Setscrew	1	
457(2)		XWXV2D	Polyslider Washer	2	
459(1)		XYE3+BJ10	Screw	1	
460(5)		XYN2+C10	Screw w/Spring Washer	2	
461(1)		XYN2+C6	Screw w/Spring Washer	2	
462(7)		XYN26+C4	Screw w/Spring Washer	2	
463(8)		XYN26+C6	Screw w/Spring Washer	5	
464(1)		XYN3+10BNC	Screw w/Spring Washer	2	
465(9)		XYNV0006	Screw w/Flat Washer	2	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
466(1)		XYN3+C12S	Screw w/Spring Washer	3	
467(1)(5)(7)		XYN3+C6S	Screw w/Spring Washer	8	
468(1)		XYN3+8S	Screw w/Srping Washer	1	
470(9)		XYNV0007	Screw w/Flat & Spring Washers		6
471(3)(5)(6)		XYN3+F6S	Screw w/Flat & Spring Washers		9
(9)					
472(1)(4)(9)		XYN3+F8S	Screw w/Flat & Spring Washers		19
473(5)		XYN4+C25S	Screw w/Flat & Spring Washers		3
475(7)		XYN4+F8S	Screw w/Flat & Spring Washers		5 for NV-8610E,EN,B
475(7)		XYN4+F8S	Screw w/Flat & Spring Washers		3 for NV-8610E
476(4)		XYN3+F45FXS	Screw w/Spring Washer	2	
477(9)		XYN3+F6RS	Screw w/Flat & Spring Washers		4
501(10)		VPG0647	Packing Case	(1)	for NV-8610E
501(10)		VPG0648	Packing Case	(1)	for NV-8610EO
501(10)		VPG0649	Packing Case	(1)	for NV-8610B
502(10)		VPN0416	Right Cushion (Bottom)	1	
503(10)		VPN0417	Left Cushion (Bottom)	1	
504(10)		VPN0381	Accessary Case	1	
505(10)		VPN0418	Right Cushion (Top)	1	
506(10)		VPN0419	Left Cushion (Top)	1	
507(10)		VPN0415	Cassette Pad	1	
508(10)		VQF0442	Fan Bag	1	
509(10)		VPF0114	Polyethylene Bag	1	
510(10)		VPF45	Polyethylene Bag	1	
511(10)		NV-E120	Blank Tape	1	Not available as service parts, please order to sales section.
512(10)		NV-A181Z	Remote Control Unit	1	
513(10)		VYC0028	Dust Cover	1	
514(10)		VJA0130	DIN-DIN Coaxial Cable	1	

ELECTRICAL REPLACEMENT PARTS LIST

Model No. NV-8610-E/-B/-EO

Notes:
1. Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
   Components identified by ⚠ have special characteristics important for safety.
   When replacing any of these components, use only the original ones.

Notes:
1. Unless otherwise specified.
   All resistors are in OHMS (Ω), 1/4W ± 5% carbon.
   K = 1,000 Ω, M = 1,000 KΩ
   All capacitors are in MICROFARADS (μF), ± 10%,
   P = μμF.

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
		VEP0168A	Power Supply P.C.Board	(1)	(NV-8610-EO)
		VEP0168B	Power Supply P.C.Board	(1)	(NV-8610-E,B)
		VEP0536B	Rec & Head Amp P.C.Board	1	
		VEP0379A	Luminance Process	1	
			P.C.Board		
		VEP0846A	Colour Process P.C.Board	1	
		VEP0289G	Servo Control P.C.Board	1	
		VEP0669H1	Regulator & Transport	1	
			P.C.Board		
		VEP0442I	Audio P.C.Board	1	
		VEP00418A	Still P.C.Board	1	
		VEP00419A	Rear Jack P.C.Board	1	
		VJB00100	Mic Jack P.C.Board	1	
		VJB00102	Memory Counter P.C.Board	1	
		VJB00107	Lamp P.C.Board	1	
		VJB00132	Supply Sensor P.C.Board	1	
		VJB00170	L.E.D. P.C.Board	1	
		VJB00171	Capstan Motor Inter-	1	
			connection P.C.Board		
		VJB00172	Loading Motor P.C.Board	1	
		VJB00183	Take-up Sensor P.C.Board	1	
		VJB00240	Antenna Selector	1	
			P.C.Board		
		VJB00298	Reel Sensor P.C.Board	1	
		VJB00266	Rear Jack P.C.Board	1	
		VJB00275	Audio/Control Head	1	
			P.C.Board		
		VJB00308	Input Selector Switch	1	
			P.C.Board		

Notes: Be sure to make your orders of replacement parts according to this List.

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
		VJB00309	Micro Switch P.C. Board	1	
		VJB00310	Leaf Switch P.C. Board	1	
		VJB00312	RF Converter Connection	1	
			P.C. Board		
		VJB00313	Power Transistor	1	
			P.C. Board		⚠
		VJB00315	Audio/Control Head Inter-	1	
			connection P.C. Board		
		VJB00340	Stop Solenoid Connection	1	
			P.C. Board		
		VJB00341	Thermo SW P.C. Board	1	
		VJB00420	Still Sub P.C. Board	1	
IC6301		DN838	Hall IC	1	
C6301		ECKW1H103PF	Ceramic 50V 0.01	1	
C6304		ECEA50N1E	Electrolytic 50V 1	1	
C6306		ECEA50Z4R7E	Electrolytic 50V 4.7	1	
C6308		ECKW1H102PF	Ceramic 50V 0.001	1	
		ENC17318	RF Converter	1	(NV-8610-B)
		ENC17319	RF Converter	1	(NV-8610-E,EO)
R6300		EVHCHAK15B15	Variable 100K	1	
R6301		ERD25TJ100	Carbon 10	1	
R6302		ERD25TJ681	Carbon 680	1	
R6303		ERD25TJ104	Carbon 100K	1	
R6305		ERD25TJ682	Carbon 6.8K	1	
R6308		ERD25TJ680	Carbon 68	1	
R6309		ERD25TJ102	Carbon 1K	1	
R6312		ERD25TJ223	Carbon 22K	1	
R6313		ERD25TJ332	Carbon 3.3K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R6315		ERD25TJ472	Carbon 4.7K	1	
		MA150	Diode	3	
		PN150NV	Diode	2	
		QSB0234	Leaf Switch	2	⚠
		VEQ0177	Timer	1	
		VEQ0174D	Demodulator	1	(NV-8610-E)
		VEQ0175D	Demodulator	1	(NV-8610-B)
		VEQ0176D	Demodulator	1	(NV-8610-EO)
			Power Button Panel Unit		
			Rear Jack Plate Unit		
			Video/Head Amp Connector Unit		
			Audio Head Connector Unit		
			Input Switch Angle Unit		
			Rear Angle Unit		
			RF Converter Unit		
			AC Cord Unit		
			Power Switch Angle Unit		
			Power Transistor Unit		
			Memory Counter Unit		
			Left Side Frame Unit		
			3 Pin Connector for Heater		

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			POWER SUPPLY PRINTED CIRCUIT BOARD		
			Diodes		
D101		10DC1N		1	⚠
D102		10DC1R		1	⚠
D103,104		10E1		2	⚠
D105		RD15FB1	Zener	1	
D106		10DC1N		1	⚠
D107		10DC1R		1	⚠
D108		10DC1N		1	⚠
D109		10DC1R		1	⚠
D110,111		MA150		2	
			Integrated Circuits		
IC101		UPC78L15A	Power Stabilization	1	
IC102		UPC78L12	Power Stabilization	1	
			Resistors		
R101		ERD75TAJ335	Solid 1W 3.3M	1	⚠
R102		ERG1ANJ331	Metal 1W 330	1	
R103		ERD25TJ222	2.2K	1	
R104		ERD25TJ103	10K	1	
			Capacitors		
C101,102		ECKDHS472MD	Ceramic 0.0047	2	⚠
C103-106		ECKW1H103PF	Ceramic 50V 0.01	4	
C107		ECEA1JS221	Electrolytic 63V 220	1	
C108,109		ECKW1H103PF	Ceramic 50V 0.01	2	
C110		ECEA1VS101	Electrolytic 100	1	
C111		ECEA1VS222	Electrolytic 2200	1	
C112		ECQM1H334KZW	Myler 50V 0.33	1	
C113,114		ECEA1ES101	Electrolytic 25V 100	2	
C115-118		ECKW1H103PF	Ceramic 50V 0.01	4	
C119		ECEA1ES222	Electrolytic 25V 2200	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C120-123		ECKW1H103PF	Ceramic 50V 0.01	4	
C124		ECET25R472SW	Electrolytic 25V 0.0047	1	
			Filters		
L101		VTQ0005		1	⚠
			Fuses		
F101		XBA2C10TR0	1A	1	⚠
F102		XBA2C025SS0	250mA	1	⚠
F103		XBA2C05TR0	500mA	1	⚠
F104		XBAVSF315ETS	3.15A	1	⚠
			Connectors		
P11		VJP0091	10 Pin	1	
P12		VJP0090	5 Pin	1	
			Miscellaneous		
		TEL302	GT Pin	2	
		VJH0073	Fuse Holder	8	
		VJH24	Test Point	20	
		VMX0226	Ceramic Spacer	6	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			VIDEO, COLOUR SECTION UNIT		
		VEP0379A	Video Printed Circuit Board	1	
		VEP0846A-1	Colour Printed Circuit Board	1	
		VHN0011	Rivet	7	
		VMA3346	Angle A	1	
		VMA2691	Angle B	1	
		XTV3+6FFXS	Screw	3	

Ref. No.		Part No.	Part Name & Description		Pcs / Set	Remarks
			LUMINANCE PROCESS PRINTED			
			CIRCUIT BOARD			
			Integrated Circuits			
IC301		AN6300	IC for AGC, White Dark		1	
			Clip, FM Modulator			
IC302		AN6331	IC for FM Demodulator,		1	
			Noise Canceller			
IC303		AN236	IC for 4.43MHz VXO		1	
IC304		SN76670N	IC for Limiter		1	
			Transistors			
Q301		2SC828			1	
Q302		2SA564			1	
Q303-309		2SC828			7	
Q310,311		2SA564			2	
Q312-314		2SC828			3	
Q315,316		2SA564			2	
Q317-324		2SC828			8	
Q325		2SA564			1	
Q326-328		2SC828			3	
Q3301-3303		2SC828			3	
			Diodes			
D301,302		MA150			2	
D303,304		1SS16			2	
D305-308		MA150			4	
D309,310		OA90			2	
			Resistors			
R301		ERD25TJ750		75	1	
R302		ERD25TJ102		1K	1	
R303		ERD25TJ122		1.2K	1	
R304-306		ERD25TJ103		10K	3	
R307		EVLS6AA00B15	Variable	100K	1	
R308		ERD25TJ124		120K	1	
R310		ERD25TJ332		3.3K	1	
R311		ERD25TJ102		1K	1	
R312		ERD25TJ151		150	1	
R313		ERD25TG911		910	1	
R314		ERD25TJ472		4.7K	1	
R315		ERD25TJ122		1.2K	1	
R316		EVLS6AA00B53	Variable	5K	1	
R317		ERD25TJ272		2.7K	1	
R318		ERD25TJ332		3.3K	1	
R319		ERD25TJ152		1.5K	1	
R320		ERD25TJ561		560	1	
R321		ER025CKF2201	Metal	2.2K	1	
R322		ERD25TJ272		2.7K	1	
R323		ERD25TJ222		2.2K	1	
R324		ERD25TJ391		390	1	
R325		ERD25TJ222		2.2K	1	
R326		ERD25TJ472		4.7K	1	
R327		ERD25TJ272		2.7K	1	
R328		ERD25TJ103		10K	1	
R329		EVLS6AA00B53	Variable	5K	1	
R330		ERD25TJ332		3.3K	1	
R332		EVLS6AA00B53	Variable	5K	1	
R333		ERD25TJ562		5.6K	1	
R334		EVLS6AA00B52	Variable	500	1	
R335		ERD25TJ820		82	1	
R336,337		ERD25TJ561		560	2	
R338		ERD25TJ223		22K	1	
R339		ERD25TJ103		10K	1	
R340		ERD25TJ222		2.2K	1	
R341,342		ERD25TJ102		1K	2	
R343		ERD25TJ393		39K	1	
R344		ERD25TJ103		10K	1	
R345		ERD25TJ221		220	1	
R346		ERD25TJ123		12K	1	

Ref. No.		Part No.	Part Name & Description		Pcs / Set	Remarks
R347		ERD25TJ393		39K	1	
R348		ERD25TJ6R8		6.8	1	
R349		ERD25TJ101		100	1	
R350		ERD25TJ682		6.8K	1	
R351		ERD25TJ560		56	1	
R352		ERD25TJ682		6.8K	1	
R353		ERD25TJ683		68K	1	
R354		ERD25TJ392		3.9K	1	
R355		ERD25TJ152		1.5K	1	
R356		ERD25TJ223		22K	1	
R357		EVLS6AA00B54	Variable	50K	1	
R358		ERD25TJ392		3.9K	1	
R359		ERD25TJ152		1.5K	1	
R360		ERD25TJ471		470	1	
R361		ERD25TJ681		680	1	
R362		ERD25TJ331		330	1	
R363		ERD25TJ153		15K	1	
R364		ERD25TJ393		39K	1	
R365		ERD14FJ820		82	1	
R366,367		ERD25TJ333		33K	2	
R368		ERD25TJ682		6.8K	1	
R369		ERD25TJ103		10K	1	
R370		ERD25TJ561		560	1	
R371		ERD25TJ222		2.2K	1	
R372		ERD25TJ561		560	1	
R373		ERD25TJ681		680	1	
R374		ERD25TJ102		1K	1	
R375		ERD25TJ392		3.9K	1	
R376		ERD25TJ472		4.7K	1	
R377		ERD25TJ681		680	1	
R378		ERD25TJ182		1.8K	1	
R379		ERD25TJ821		820	1	
R380		ERD25TJ822		8.2K	1	
R381		ERD25TJ182		1.8K	1	
R382		ERD25TJ331		330	1	

Ref. No.		Part No.	Part Name & Description		Pcs / Set	Remarks
R383		EVLS6AA00B23	Variable	2K	1	
R384		ERD25TJ563		56K	1	
R385		ERD25TJ221		220	1	
R386		ERD25TJ153		15K	1	
R387		ERD25TJ333		33K	1	
R388		ERD25TJ122		1.2K	1	
R389		ERD25TJ102		1K	1	
R390		ERD25TJ333		33K	1	
R393,394		ERD25TJ821		820	2	
R395		ERD25TJ102		1K	1	
R396		ERD25TJ471		470	1	
R397		ERD25TJ391		390	1	
R398		ERD25TJ562		5.6K	1	
R399		ERD25TJ103		10K	1	
R3100		ERD25TJ474		470K	1	
R3101		ERD25TJ561		560	1	
R3102		ERD25TJ681		680	1	
R3103,3104		ERD25TJ102		1K	2	
R3105		ERD25TJ222		2.2K	1	
R3106,3107		ERD25TJ391		390	2	
R3108,3109		ERD25TJ102		1K	2	
R3110		EVLS6AA00B54	Variable	50K	1	
R3111		ERD25TJ102		1K	1	
R3112		ERD25TJ181		180	1	
R3113		ERD25TJ821		820	1	
R3114		ERD25TJ333		33K	1	
R3115		ERD25TJ221		220	1	
R3116		ERD25TJ473		47K	1	
R3117		ERD25TJ221		220	1	
R3118		ERD25TJ102		1K	1	
R3119		ERD25TJ221		220	1	
R3120		ERD25TJ102		1K	1	
R3121		ERD25TJ221		220	1	
R3122		ERD25TJ473		47K	1	
R3123		ERD25TJ123		12K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R3124-3127		ERD25TJ102	1K	4	
R3128		ERD25TJ222	2.2K	1	
R3129,3130		ERD25TJ102	1K	2	
R3131		ERD25TJ680	68	1	
R3132		ERD25TJ331	330	1	
R3133		ERD25TJ103	10K	1	
R3134		ERD25TJ333	33K	1	
R3135		ERD25TJ472	4.7K	1	
R3136		ERD25TJ102	1K	1	
R3137		EVLS6AA00B13	Variable 1K	1	
R3138		ERD25TJ122	1.2K	1	
R3139		ERD25TJ273	27K	1	
R3140		ERD25TJ183	18K	1	
R3141,3142		ERD25TJ271	270	2	
R3143		ERD25TJ331	330	1	
R3144		ERD25TJ222	2.2K	1	
R3145		ERD25TJ331	330	1	
R3146		ERD25TJ330	33	1	
R3147		ERD25TJ103	10K	1	
R3148		ERD25TJ102	1K	1	
R3149		ERD25TJ121	120	1	
R3150		ERD25TJ821	820	1	
R3151		EVLS6AA00B24	Variable 20K	1	
R3152		ERD25TJ224	220K	1	
R3153		ERD25TJ152	1.5K	1	
R3154		ERD25TJ102	1K	1	
R3155		ERD25TJ102	1K	1	
R3156		ERD25TJ222	2.2K	1	
R3157		ERD25TJ103	10K	1	
R3158		ERD25TJ333	33K	1	
R3159		ERD25TJ221	220	1	
R3160		ERD25TJ561	560	1	
R3161		ERD25TJ101	100	1	
R3162		ERD25TJ392	3.9K	1	
R3163		ERD25TJ221	220	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R3164		ERD25TJ821	820	1	
R3165		ERD25TJ473	47K	1	
R3167		ERD25TJ102	1K	1	
R3302		ERD25TJ332	3.3K	1	
R3303		ERD25TJ223	22K	1	
R3304		ERD25TJ822	8.2K	1	
R3305		ERD25TJ182	1.8K	1	
R3306		ERD25TJ272	2.7K	1	
R3307		ERD25TJ332	3.3K	1	
			Thermistors		
TH301		ERTD2FHL102S		1	
			Capacitors		
C301		ECEA1CS220B	Electrolytic 16V 22	1	
C302		ECEA0JS470B	Electrolytic 6V 47	1	
C303		ECQM1H472KZW	Myler 50V 0.0047	1	
C304		ECEA6N100M	Electrolytic 6V 100	1	
C305		ECEA1CS470E	Electrolytic 16V 47	1	
C306		ECEA50ZR1E	Electrolytic 50V 0.1	1	
C307		VCY25473KW	Semiconductor	1	
C308		ECQM1H333KZW	Myler 50V 0.033	1	
C309		ECKR1H103PF	Ceramic 50V 0.01	1	
C310		ECEA1CS221E	Electrolytic 16V 220	1	
C311		ECEA0JS470B	Electrolytic 6V 47	1	
C312		ECEA6N47Z	Electrolytic 6V 47	1	
C313		ECCW1H151KC	Ceramic 50V 150P	1	
C314		ECCW1H820KC	Ceramic 50V 82P	1	
C315		ECEA25N4R7E	Electrolytic 25V 4.7	1	
C316		ECKW1H103PF	Ceramic 50V 0.01	1	
C317		ECEA1CS101E	Electrolytic 16V 100	1	
C318		ECEA1CS470B	Electrolytic 16V 47	1	
C319		ECCW1H680JC	Ceramic 50V 68P	1	
C320		ECV1ZW20X44	Trimmer 20pF	1	
C321		ECCW1H220KC	Ceramic 50V 22P	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C322		ECCW1H561J	Ceramic 50V 560P	1	
C323		ECEA0JS101E	Electrolytic 6V 100	1	
C324		ECKR1H103PF	Ceramic 50V 0.01	1	
C325		ECKR1H103PF	Ceramic 50V 0.01	1	
C326		ECEA1CS470B	Electrolytic 16V 47	1	
C327		ECKR1H103PF	Ceramic 50V 0.01	1	
C328		ECKR1H103PF	Ceramic 50V 0.01	1	
C329		ECKW1H331KB	Ceramic 50V 330P	1	
C330		ECCR1H680KC	Ceramic 50V 68P	1	
C331		ECKR1H103PF	Ceramic 50V 0.01	1	
C332		ECKW1H103PF	Ceramic 50V 0.01	1	
C333		ECCW1H151KC	Ceramic 50V 150P	1	
C334		ECKW1H391KB	Ceramic 50V 390P	1	
C335		ECKR1H103PF	Ceramic 50V 0.01	1	
C336		ECEA1CS100B	Electrolytic 16V 10	1	
C337		ECEA0JS470B	Electrolytic 6V 47	1	
C338		ECEA1CS470B	Electrolytic 16V 47	1	
C339		ECQM1H104KZW	Myler 50V 0.1	1	
C340		ECKR1H103PF	Ceramic 50V 0.01	1	
C341		ECQM1H222KZW	Myler 50V 0.0022	1	
C342		ECKW1H103PF	Ceramic 50V 0.01	1	
C343		ECCW1H270KC	Ceramic 50V 27P	1	
C344		ECKR1H103PF	Ceramic 50V 0.01	1	
C345		ECCW1H101KC	Ceramic 50V 100P	1	
C346		ECCW1H390JU	Ceramic 50V 39P	1	
C347		ECCW1H470JU	Ceramic 50V 47P	1	
C348		ECCW1H150JU	Ceramic 50V 15P	1	
C349		ECEA1CS100B	Electrolytic 16V 10	1	
C350		ECEA50ZR1E	Electrolytic 50V 0.1	1	
C351		ECEA1ES4R7E	Electrolytic 25V 4.7	1	
C352		ECQM1H222KZW	Myler 50V 0.0022	1	
C353		ECKW1H103PF	Ceramic 50V 0.01	1	
C354		ECEA1CS470B	Electrolytic 16V 47	1	
C355		ECCW1H181KC	Ceramic 50V 180P	1	
C356		ECEA1CS100E	Electrolytic 16V 10	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C357		ECEA0JS470B	Electrolytic 6V 47	1	
C358		ECEA0JS221E	Electrolytic 6V 220	1	
C359		ECEA1CS470B	Electrolytic 16V 47	1	
C360		ECQM1H102JZW	Myler 50V 0.001	1	
C361		ECCW1H121KC	Ceramic 50V 120P	1	
C362		ECEA1CS101B	Electrolytic 16V 100	1	
C363		ECCW1H101KC	Ceramic 50V 100P	1	
C364		ECCW1H390KC	Ceramic 50V 39P	1	
C365		ECCW1H560KC	Ceramic 50V 56P	1	
C366		ECEA1CS100B	Electrolytic 16V 10	1	
C367		ECCD1H220JC	Ceramic 50V 22P	1	
C368		ECEA6N47Z	Electrolytic 6V 47	1	
C369		ECCR1H680KC	Ceramic 50V 68P	1	
C370		ECKR1H103PF	Ceramic 50V 0.01	1	
C372		ECEA1CS470B	Electrolytic 16V 47	1	
C373		ECCW1H330KC	Ceramic 50V 33P	1	
C374		ECKW1H391KB	Ceramic 50V 390P	1	
C375		ECQM1H102KZ3	Myler 50V 0.001	1	
C376		ECEA1AS471E	Electrolytic 10V 470	1	
C377		ECEA0JS471E	Electrolytic 6V 470	1	
C378		ECEA0JS470B	Electrolytic 6V 47	1	
C379		ECEALHS010B	Electrolytic 50V 1	1	
C380		ECEA1AS470E	Electrolytic 10V 47	1	
C381		ECKW1H182KB	Ceramic 50V 0.0018	1	
C382		ECCW1H101KC	Ceramic 50V 100P	1	
C383		ECKW1H103PF	Ceramic 50V 0.01	1	
C384		ECEA0JS470B	Electrolytic 6V 47	1	
C385		ECKR1H103PF	Ceramic 50V 0.01	1	
C387		ECCW1H101KC	Ceramic 50V 100P	1	
C388		ECCW1H431J	Ceramic 50V 430P	1	
C389		ECCW1H680KC	Ceramic 50V 68P	1	
C390		ECCR1H820KC	Ceramic 50V 82P	1	
C391		ECCR1H680KC	Ceramic 50V 68P	1	
C392		ECEA1CS470B	Electrolytic 16V 47	1	
C393		ECEA1CS470B	Electrolytic 16V 47	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C394		ECCW1H180KC	Ceramic 50V 18P	1	
C395		ECCW1H390KC	Ceramic 50V 39P	1	
C396		ECKW1H271KB	Ceramic 50V 270P	1	
C397		ECKR1H103PF	Ceramic 50V 0.01	1	
C3100		ECKR1H103PF	Ceramic 50V 0.01	1	
C3101		ECKW1H103PF	Ceramic 50V 0.01	1	
C3103		ECKR1H103PF	Ceramic 50V 0.01	1	
C3104		ECEA1CS100B	Electrolytic 16V 10	1	
C3105		ECCW1H220KC	Ceramic 50V 22P	1	
C3106		ECKR1H103PF	Ceramic 50V 0.01	1	
C3107		ECEA1CS100B	Electrolytic 16V 10	1	
C3109		ECKR1H103PF	Ceramic 50V 0.01	1	
C3110		ECKW1H103PF	Ceramic 50V 0.01	1	
C3111		ECKR1H103PF	Ceramic 50V 0.01	1	
C3112		ECCW1H330KC	Ceramic 50V 33P	1	
C3113,3114		ECCW1H270KC	Ceramic 50V 27P	2	
C3115		ECKR1H103PF	Ceramic 50V 0.01	1	
C3116		ECKR1H103PF	Ceramic 50V 0.01	1	
C3117		ECQM1H473KZ3	Myler 50V 0.047	1	
C3118,3119		ECKW1H103PF	Ceramic 50V 0.01	2	
C3120		ECQM1H473KZW	Myler 50V 0.047	1	
C3121		ECCW1H270KC	Ceramic 50V 27P	1	
C3122		ECCW1H070FC	Ceramic 50V 7P	1	
C3123		ECCW1H270KC	Ceramic 50V 7P	1	
C3124		ECEA1CS470B	Electrolytic 16V 47	1	
C3125		ECCW1H330KC	Ceramic 50V 33P	1	
C3126		ECEA0JS470B	Electrolytic 6V 47	1	
C3127,3128		ECKR1H103PF	Ceramic 50V 0.01	2	
C3129		ECCW1H390KC	Ceramic 50V 39P	1	
C3152		ECCW1H121K	Ceramic 50V 120P	1	
C3153		ECCW1H680KC	Ceramic 50V 68P	1	
			Coils		
L301-303		VLQ80W221K	220μH	3	
L304		VLQ80W121K	120μH	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
L305		VLQ80W820K	82μH	1	
L306		VLQ80W221K	220μH	1	
L307		VLQ80W3R3K	3.3μH	1	
L308		VLQ80W390K	39μH	1	
L309-311		VLQ80W221K	220μH	3	
L312		VLQ80W390K	39μH	1	
L313		VLQ80W330K	33μH	1	
L314		VLQ80W101K	100μH	1	
L315		VLQ80W102K	1mH	1	
L316		VLQ80W561K	560μH	1	
L317,318		VLQ80W100K	10μH	2	
L321		VLQ80W560K	56μH	1	
L322		VLQ80W151K	150μH	1	
L323		VLQ80W560K	56μH	1	
L324		VLQ80W330K	33μH	1	
L325		VLQ80W390K	39μH	1	
L326		VLQ80W221K	220μH	1	
L327		VLQ80W680K	68μH	1	
L328		VLQ80W180K	18μH	1	
L330		VLQ80W221K	220μH	1	
L333		VLQ80W3R3K	3.3μH	1	
L334		VLQ80W102K	1mH	1	
L335		VLQ80W220K	22μH	1	
			Delay Lines		
DL301		EFDEN645A01	1H	1	
			Filters		
FL301		VLF0056		1	
FL302		VLF0074		1	
FL303		VLF0082		1	
FL304		VLF6		1	
FL305		VLF0061		1	
FL306		VLF0069		1	
FL308		VLF0073		1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Transformers		
T301		EIK10H2	High Frequency	1	
			Oscillators		
X301		VSX0057	Crystal 4.43MHz	1	
			Connectors		
P31		VJP0089	3 Pin	1	
P32,33		VJP0091	10 Pin	2	
P34,35		VJP0090	5 Pin	2	
			Miscellaneous		
		VJH0096Z	Check Terminal	18	
		VMX0226	Ceramic Spacer	2	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			COLOUR PROCESS PRINTED		
			CIRCUIT BOARD		
			Transistors		
Q802-811		2SC828		10	
Q812		2SA564		1	
Q813-815		2SC828		3	
Q816,817		2SA564		2	
Q818-821		2SC828		4	
Q822,823		2SA564		2	
Q824		2SC828		1	
			Diodes		
D801		OA90		1	
D802-807		MA150		6	
			Integrated Circuits		
IC801		AN305	IC for AGC, Balance	1	
			Modulator		
IC802		AN337	IC for AFC Circuit	1	
IC803		AN236	IC for APC Circuit	1	
IC804		AN6342	IC for Count Down	1	
IC805		MN6061A	IC for Switching	1	
			Filters		
FL801		VLF6		1	
FL802		VLF0058		1	
FL803		VLF0059		1	
			Resistors		
R803		ERD25TJ474	470K	1	
R804		ERD25TJ103	10K	1	
R805		ERD25TJ102	1K	1	
R806		EVLS6AA00B53	Variable 5K	1	
R807		ERD25TJ334	330K	1	

Ref. No.		Part No.	Part Name & Description		Pcs / Set	Remarks
R808		ERD25TJ682		6.8K	1	
R809		EVLS6AA00B14	Variable	10K	1	
R810		EVLS6AA00B53	Variable	5K	1	
R811		ERD25TJ332		3.3K	1	
R812		ERD25TJ152		1.5K	1	
R813		EVLS6AA00B13	Variable	1K	1	
R814		ERD25TJ222		2.2K	1	
R815,816		ERD25TJ271		270	2	
R817		ERD25TJ333		33K	1	
R818		ERD25TJ152		1.5K	1	
R819		ERD25TJ822		8.2K	1	
R820		ERD25TJ183		18K	1	
R821		ERD25TJ103		10K	1	
R822		ERD25TJ102		1K	1	
R823		ERD25TJ222		2.2K	1	
R824		ERD25TJ271		270	1	
R825		ERD25TJ562		5.6K	1	
R826		ERD25TJ123		12K	1	
R827,828		ERD25TJ102		1K	2	
R829		ERD25TJ561		560	1	
R830		ERD25TJ102		1K	1	
R831		ERD25TJ152		1.5K	1	
R832,833		ERD25TJ273		27K	2	
R834		ERD25TJ332		3.3K	1	
R835		ERD25TJ333		33K	1	
R836		ERD25TJ183		18K	1	
R837		ERD25TJ471		470	1	
R838		ERD25TJ102		1K	1	
R839		ERD25TJ391		390	1	
R840		ERD25TJ181		180	1	
R841		ERD25TJ682		6.8K	1	
R842		ERD25TJ563		56K	1	
R843-847		ERD25TJ391		390	5	
R848		EVLS6AA00B12	Variable	100	1	
R849		ERD25TJ681		680	1	
R850		ERD25TJ102		1K	1	
R851		ERD25TJ181		180	1	
R852		ERD25TJ473		47K	1	
R853		ERD25TJ822		8.2K	1	
R854		ERD25TJ122		1.2K	1	
R855		ERD25TJ153		15K	1	
R856		ERD25TJ123		12K	1	
R857		ERD25TJ562		5.6K	1	
R858		ERD25TJ682		6.8K	1	
R859		ERD25TJ223		22K	1	
R861		ERD25TJ183		18K	1	
R862		ERD25TJ472		4.7K	1	
R863		ERD25TJ562		5.6K	1	
R864,865		ERD25TJ153		15K	2	
R866		ERD25TJ562		5.6K	1	
R867		ERD25TJ332		3.3K	1	
R868		ERD25TJ153		15K	1	
R869		ERD25TJ473		47K	1	
R870		ERD25TJ393		39K	1	
R871		ERD25TJ123		12K	1	
R873		ERD25TJ101		100	1	
R874		ERD25TJ471		470	1	
R875		ERD25TJ222		2.2K	1	
R876,877		ERD25TJ223		22K	2	
R878		ERD25TJ392		3.9K	1	
R879		ERD25TJ223		22K	1	
R880		ERD25TJ682		6.8K	1	
R881		ERD25TJ560		56	1	
R882		ERD25TJ682		6.8K	1	
R883		ERD25TJ152		1.5K	1	
R884		ERD25TJ102		1K	1	
R885		ERD25TJ683		68K	1	
R886		ERD25TJ392		3.9K	1	
R887		ERD25TJ152		1.5K	1	
R888		ERD25TJ153		15K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R889		ERD25TJ393	39K	1	
R890		ERD25TJ221	220	1	
R892		EVLS6AA00B23	Variable 2K	1	
R893		ERD25TJ331	330	1	
R894		ERD25TJ272	2.7K	1	
R895		ERD25TJ101	100	1	
R897,898		ERD25TJ562	5.6K	2	
R899		EVLS6AA00B54	Variable 50K	1	
R8100		ERD25TJ332	3.3K	1	
R8103		ERD25TJ222	2.2K	1	
R8104		ERD25TJ102	1K	1	
R8105		ERD25TJ153	15K	1	
R8106		ERD25TJ472	4.7K	1	
R8107		ERD25TJ473	47K	1	
R8108		ERD25TJ562	5.6K	1	
R8109		ERD25TJ472	4.7K	1	
R8110		ERD25TJ103	10K	1	
R8111		ERD25TJ183	18K	1	
R8112		ERD25TJ153	15K	1	
R8113		ERD25TJ392	3.9K	1	
R8114		ERD25TJ822	8.2K	1	
R8115		ERD25TJ564	560K	1	
R8116		ERD25TJ223	22K	1	
R8117		ERD25TJ153	15K	1	
R8118		EVLS6AA00B54	Variable 50K	1	
R8119		ERD25TJ222	2.2K	1	
			Capacitors		
C802		ECEA50ZR47E	Electrolytic 50V 0.47	1	
C803		ECKW1H103PF	Ceramic 50V 0.01	1	
C805		ECEA1CS100E	Electrolytic 16V 10	1	
C806		ECKR1H103PF	Ceramic 50V 0.01	1	
C807		ECKW1H103PF	Ceramic 50V 0.01	1	
C808		ECKR1H103PF	Ceramic 50V 0.01	1	
C809		ECKW1H103PF	Ceramic 50V 0.01	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C810		ECKR1H103PF	Ceramic 50V 0.01	1	
C811		ECEA1HS010E	Electrolytic 50V 1	1	
C812		ECCR1H390KC	Ceramic 50V 39P	1	
C813		ECEA16N4R7E	Electrolytic 16V 4.7	1	
C814		ECKW1H103PF	Ceramic 50V 0.01	1	
C815		ECEA1CS100B	Electrolytic 16V 10	1	
C816		ECEA1CS470B	Electrolytic 16V 47	1	
C817		ECQM1H152KZW	Myler 50V 0.0015	1	
C818		ECQM1H103KZW	Myler 50V 0.01	1	
C819		ECCR1H120KC	Ceramic 50V 12P	1	
C820		ECKW1H271KB	Ceramic 50V 270P	1	
C821		ECV1ZW10X32	Trimmer 1W 10pF	1	
C822		ECCR1H101KC	Ceramic 50V 100P	1	
C823		ECKR1H103PF	Ceramic 50V 0.01	1	
C824		ECEA1ES4R7B	Electrolytic 25V 4.7	1	
C825		ECKW1H103PF	Ceramic 50V 0.01	1	
C826		ECCW1H101JL	Ceramic 50V 100P	1	
C827		ECCW1H101KC	Ceramic 50V 100P	1	
C828		ECEA1CS100B	Electrolytic 16V 10	1	
C829		ECKW1H561KB	Ceramic 50V 560P	1	
C830		ECKR1H221KB	Ceramic 50V 220P	1	
C831		ECEA1HS010B	Electrolytic 50V 1	1	
C832		ECKR1H681KB	Ceramic 50V 680P	1	
C833		ECEA1HS010B	Electrolytic 50V 1	1	
C834		ECEA16N47UE	Electrolytic 16V 47	1	
C835		ECKW1H103PF	Ceramic 50V 0.01	1	
C836		ECKR1H103PF	Ceramic 50V 0.01	1	
C837		ECEA1CS100B	Electrolytic 16V 10	1	
C838		ECEA1CS470B	Electrolytic 16V 47	1	
C840,841		ECKR1H103PF	Ceramic 50V 0.01	2	
C842		ECQM1H393KZ3	Myler 50V 0.039	1	
C845		ECQM1H273KZW	Myler 50V 0.027	1	
C846		ECCW1H151KC	Ceramic 50V 150P	1	
C847		ECKW1H391KB	Ceramic 50V 390P	1	
C849		ECCW1H330KC	Ceramic 50V 33P	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C850		ECKR1H103PF	Ceramic 50V 0.01	1	
C851		ECEA1CS470B	Electrolytic 16V 47	1	
C852		ECQM1H104KZW	Myler 50V 0.1	1	
C853		ECEA0JS470B	Electrolytic 6V 47	1	
C854		ECEA0JS470E	Electrolytic 6V 47	1	
C855		ECEA1CS100E	Electrolytic 16V 10	1	
C856,857		ECKW1H103PF	Ceramic 50V 0.01	2	
C858		ECQM1H222KZ3	Myler 50V 0.0022	1	
C859		ECQM1H222KZW	Myler 50V 0.0022	1	
C860		ECEA1ES4R7B	Electrolytic 25V 4.7	1	
C861		ECEA50ZR1E	Electrolytic 50V 0.1	1	
C862		ECEA1CS100E	Electrolytic 16V 10	1	
C863		ECCW1H150JU	Ceramic 50V 15P	1	
C864		ECCW1H470JU	Ceramic 50V 47P	1	
C865		ECCW1H390JU	Ceramic 50V 39P	1	
C866		ECCW1H101KC	Ceramic 50V 100P	1	
C867		ECKW1H103PF	Ceramic 50V 0.01	1	
C868		ECKR1H103PF	Ceramic 50V 0.01	1	
C869		ECKW1H103PF	Ceramic 50V 0.01	1	
C870		ECEA1CS100B	Electrolytic 16V 10	1	
C871		ECKR1H103PF	Ceramic 50V 0.01	1	
C872		ECEA1CS100B	Electrolytic 16V 10	1	
C873		ECCW1H560KC	Ceramic 50V 56P	1	
C874,875		ECKR1H391KB	Ceramic 50V 390P	2	
C876		ECCR1H560KC	Ceramic 50V 56P	1	
C877,878		ECEA1HS010B	Electrolytic 50V 1	2	
C879		ECKW1H271KB	Ceramic 50V 270P	1	
C880		ECEA0JS470B	Electrolytic 6V 47	1	
C881		ECCW1H390KC	Ceramic 50V 39P	1	
C883		ECEA1CS100B	Electrolytic 16V 10	1	
C884		ECEA1CS100E	Electrolytic 16V 10	1	
C885		ECKW1H103PF	Ceramic 50V 0.01	1	
C886		ECEA1CS470B	Electrolytic 16V 47	1	
C887		ECQM1H104KZW	Myler 50V 0.1	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Inductances		
L801-803		VLQ80W221K	220μH	3	
L804		VLQ80W330K	33μH	1	
L805,806		VLQ80W221K	220μH	2	
L807		VLQ80W3R3J	3.3μH	1	
L808		VLQ80W270K	27μH	1	
L809		VLQ80W221K	220μH	1	
L810		VLQ80W682K	6.8mH	1	
L811,812		VLQ80W221K	220μH	2	
			Transformers		
T801,802		EIK10S572Z	High Frequency Coil	2	
			Delay Lines		
DL801		EFDHN124A11A	2H	1	
			Oscillators		
X801		VSX0058	Crystal	1	
X802		VSX0059	Crystal	1	
			Miscellaneous		
		VJH0096Z	Check Terminal	14	
		VSC0282	Shield Case A	1	
		VSC0283	Shield Case B	1	
		VSC0284	Shield Case C	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			SERVO, AUDIO SECTION UNIT		
		VEP0289G	Servo Control Printed	1	
			Circuit Board		
		VEP0442I	Audio Printed Circuit	1	
			Board		
		VHN0011	Rivet	10	
		VJF0004	Wire Holder	1	
		VMA3344	Angle A	1	
		VMA3345	Angle B	1	
		VSC0396	Shield Board	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			SERVO CONTROL		
			PRINTED CIRCUIT BOARD		
			Integrated Circuits		
IC201		NA6340	IC for Control Circuit	1	
IC202		AN6811	IC for Control Circuit	1	
IC203		AN6341	IC for Count Down	1	
			Transistors		
Q201		2SC1327		1	
Q202		2SA564		1	
Q203		2SC1684		1	
Q204		2SA721		1	
Q205		2SA564		1	
Q206		2SC2497		1	
Q207		2SA564		1	
Q208		2SC2497		1	
Q209		2SA564		1	
Q210		2SC2497		1	
Q211		2SC1684		1	
Q212		2SA564A		1	
Q213		2SC1684		1	
Q214		2SA564		1	
Q215		2SC1684		1	
Q224		2SA564		1	
Q225,226		2SC1684		2	
Q227		2SC1685		1	
Q228		2SA699		1	
Q229,230		2SC1684		2	
			Diodes		
D202-207		MA150TA		6	
D208-210		MA150DD		3	
D211-213		MA150TA		3	
D216		MA150TA		1	
D221-227		MA150TA		7	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Resistors		
R201		ERD25TJ562	5.6K	1	
R202		ERD25TJ563	56K	1	
R203		ERD25TJ332	3.3K	1	
R205		ERD25TJ124	120K	1	
R206		ERD25TJ222	2.2K	1	
R207,208		ERD25TJ105	1M	2	
R209		EVLS6AA00B54	Variable 50K	1	
R210		ERD25TJ682	6.8K	1	
R211		EVLS6AA00B54	Variable 50K	1	
R212		ERD25TJ682	6.8K	1	
R213		EVLS6AA00B15	Variable 100K	1	
R214		ERD25TJ683	68K	1	
R215		ERD25TJ472	4.7K	1	
R216		ERD25TJ123	12K	1	
R217		ERD25TG683	±2% 68K	1	
R218		ERD25TG184	±2% 180K	1	
R219		ERD25TJ332	3.3K	1	
R220		ERD25TG472	±2% 4.7K	1	
R221		ERD25TJ221	220	1	
R222		ERD25TG222	±2% 2.2K	1	
R223		EVLS6AA00B54	Variable 50K	1	
R224		ERD25TJ823	82K	1	
R225		ERD25TJ473	47K	1	
R226		ERD25TJ104	100K	1	
R227		ERD25TJ152	1.5K	1	
R228		ERD25TJ332	3.3K	1	
R229		ERC14GK155	Solid 1.5M	1	
R230		ERD25TJ562	5.6K	1	
R231,232		ERD25TJ332	3.3K	2	
R233		ERD25TJ103	10K	1	
R234		ERD25TJ822	8.2K	1	
R235		ERD25TJ104	100K	1	
R236		ERD25TJ103	10K	1	
R237		ERD25TJ223	22K	1	
R238		ERD25TJ333	33K	1	
R239		ERD25TJ392	3.9K	1	
R240		ERD25TJ681	680	1	
R241		ERD25TJ223	22K	1	
R242		ERX12ANJR82	Metal 1/2W 0.82	1	
R243		ERD25TJ392	3.9K	1	
R244		ERD25TJ470	47	1	
R245		ERD25TJ223	22K	1	
R246		ERD25TJ682	6.8K	1	
R247		ERD25TJ470	47	1	
R248		ERD25TJ223	22K	1	
R249		ERD25TJ682	6.8K	1	
R250		ERD25TJ470	47	1	
R251		ERD25TJ471	470	1	
R252		ERD25TJ153	15K	1	
R253		ERD25TJ152	1.5K	1	
R254		ERD25TJ273	27K	1	
R255		ERD25TJ561	560	1	
R256		ERD25TJ681	680	1	
R257		ERD25TJ683	68K	1	
R258		ERD25TJ333	33K	1	
R259,260		ERD25TJ332	3.3K	2	
R261		ERD25TJ392	3.9K	1	
R262		EVLS6AA00B53	Variable 5K	1	
R263		ERD25TJ822	8.2K	1	
R264		ERD25TJ331	330	1	
R265		ERD25TJ330	33	1	
R266		ERD25TJ272	2.7K	1	
R267		ERD25TJ102	1K	1	
R268		ERD25TJ474	470K	1	
R269		ERD25TJ154	150K	1	
R270		EVLS6AA00B15	Variable 100K	1	
R271		ERD25TJ473	47K	1	
R276,277		ERD25TJ473	47K	2	
R281		ERD25TJ104	100K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R299		ERD25TJ683	68K	1	
R2100		ERD25TJ153	15K	1	
R2101		ERD25TJ183	18K	1	
R2102		ERD25TG184	±2% 180K	1	
R2103		ERC14GK685	Solid 6.8M	1	
R2104		ERD25TG124	±2% 120K	1	
R2105		ERD25TJ682	6.8K	1	
R2106		ERD25TJ473	47K	1	
R2107		ERD25TG392	±2% 3.9K	1	
R2108		ERD25TG222	±2% 2.2K	1	
R2109,2110		ERD25TJ271	270	2	
R2111		ERD25TG821	±2% 820	1	
R2112		ERD25TJ273	27K	1	
R2113		ERD25TJ104	100K	1	
R2114		ERD25TJ393	39K	1	
R2115		ERD25TJ224	220K	1	
R2116		EVLS6AA00B54	Variable 50K	1	
R2117		ERD25TJ683	68K	1	
R2118		ERD25TG154	±2% 150K	1	
R2119		ERD25TJ105	1M	1	
R2120		ERD25TJ332	3.3K	1	
R2121		ERD25TJ103	10K	1	
R2123		ERD25TJ332	3.3K	1	
R2124		ERD25TJ102	1K	1	
R2126		ERD25TJ102	1K	1	
R2129		ERD25TJ104	100K	1	
R2130		ERD25TJ332	3.3K	1	
R2131		ERD25TJ472	4.7K	1	
R2132		EVLS6AA00B54	Variable 50K	1	
R2133		ERD25TJ683	68K	1	
R2134		ERD25TJ184	180K	1	
R2135		ERD25TJ332	3.3K	1	
R2136		ERD25TJ472	4.7K	1	
R2137		ERD25TJ102	1K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Capacitors		
C201		ECQM1H472KZW	Myler 50V 0.0047	1	
C202		ECEA1HS010E	Electrolytic 50V 1	1	
C203		ECQM1H472KZ3	Myler 50V 0.0047	1	
C204		ECSF35ER33KE	35V 0.33	1	
C205		ECEA1HS010E	Electrolytic 50V 1	1	
C206		ECEA1HS010B	Electrolytic 50V 1	1	
C207,208		ECQM1H683KZW	Myler 50V 0.068	2	
C209		ECQM1H223KZ3	Myler 50V 0.022	1	
C210,211		ECQM1H104KZW	Myler 50V 0.1	2	
C212		ECEA16Z100E	Electrolytic 16V 100	1	
C213		ECEA1CS221E	Electrolytic 16V 220	1	
C214		ECEA50ZR22E	Electrolytic 50V 0.22	1	
C215		ECEA1CS470B	Electrolytic 16V 47	1	
C216		ECEA1CS470E	Electrolytic 16V 47	1	
C217		ECQM1H104KZW	Myler 50V 0.1	1	
C218		ECQM1H154KZW	Myler 50V 0.15	1	
C220		ECQM1H184KZW	Myler 50V 0.18	1	
C221		ECEA1HS010B	Electrolytic 50V 1	1	
C222		ECEA50ZR22E	Electrolytic 50V 0.22	1	
C223		ECEA1ES4R7E	Electrolytic 25V 4.7	1	
C224		ECEA1HS010E	Electrolytic 50V 1	1	
C225		ECEA50ZR68B	Electrolytic 50V 0.68	1	
C226		ECQM1H473KZ3	Myler 50V 0.047	1	
C227		ECEA50N1E	Electrolytic 50V 1	1	
C228		ECQM1H393KZW	Myler 50V 0.039	1	
C229		ECEA50N1E	Electrolytic 50V 1	1	
C230		ECQM1H393KZW	Myler 50V 0.039	1	
C231		ECEA50N1E	Electrolytic 50V 1	1	
C232		ECEA50ZR1E	Electrolytic 50V 0.1	1	
C233		ECEA50ZR68B	Electrolytic 50V 0.68	1	
C234		ECQM1H562KZW	Myler 50V 0.0056	1	
C235		ECEA1CS100B	Electrolytic 16V 10	1	
C236,237		ECQM1H153KZ3	Myler 50V 0.015	2	
C238		ECQM1H393KZW	Myler 50V 0.039	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C239		ECEA1CS100B	Electrolytic 16V 10	1	
C240		ECQM1H223KZW	Myler 50V 0.022	1	
C241		ECQM1H102KZ3	Myler 50V 0.001	1	
C250		ECEA1HS010B	Electrolytic 50V 1	1	
C251		ECQM1H103KZ3	Myler 50V 0.01	1	
C252		ECEA1CS100B	Electrolytic 16V 10	1	
C253		ECSF35ER33KE	35V 0.33	1	
C254,255		ECQM1H104KZW	Myler 50V 0.1	2	
C256		ECEA1CS470B	Electrolytic 16V 47	1	
C257		ECEA1CS100E	Electrolytic 16V 10	1	
C258		ECQM1H473KZ3	Myler 50V 0.047	1	
C259		ECQM1H473KZW	Myler 50V 0.047	1	
C260		ECQM1H104KZW	Myler 50V 0.1	1	
C261		ECEA1HS010B	Electrolytic 50V 1	1	
C262		ECQM1H103KZW	Myler 50V 0.01	1	
C263		ECEA50ZR1E	Electrolytic 50V 0.1	1	
C264		ECQM1H103KZ3	Myler 50V 0.01	1	
C265,266		ECQM1H184KZW	Myler 50V 0.18	2	
C267		ECQM1H823KZW	Myler 50V 0.082	1	
C269		ECEA1ES4R7E	Electrolytic 25V 4.7	1	
			Coils		
L201		VLQ80F102K	1mH	1	
			Connectors		
P21,22		VJP0091	10 Pin	2	
P23		VJP0090	5 Pin	1	
P24		VJP1069	12 Pin	1	
P25		VJP0090	5 Pin	1	
			Miscellaneous		
		VJH0096Z	Check Terminal	17	
		VSC0362	Heat Sink	1	
		XYN3+F8FXS	Screw	3	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			AUDIO PRINTED CIRCUIT		
			BOARD		
			Integrated Circuits		
IC401		AN262	IC for AGC, Equalizer,	1	
			Amplifier		
			Transistors		
Q401,402		2SC1684		2	
Q403,404		2SC1318		2	
Q407		2SA719		1	
Q408		2SA564		1	
Q409		2SC1684		1	
Q410		2SA564		1	
Q411,412		2SC1684		2	
Q413		2SA683		1	
			Diodes		
D401-405		MA150		5	
D406		MA150		1	
D409		MA150		1	
			Resistors		
R401		ERD25TJ473	47K	1	
R402		ERD25TJ392	3.9K	1	
R403		ERD25TJ104	100K	1	
R404		EVLS6AA00B53	Variable 5K	1	
R405		EVLS6AA00B24	Variable 20K	1	
R406		ERD25TJ181	180	1	
R407		ERD25TJ102	1K	1	
R409		ERD25TJ562	5.6K	1	
R410		ERD25TJ474	470K	1	
R411		ERD25TJ105	1M	1	
R412		ERD25TJ102	1K	1	
R413		ERD25TJ562	5.6K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R414		ERD25TJ103	10K	1	
R415		ERD25TJ393	39K	1	
R416		ERD25TJ273	27K	1	
R417		ERD25TJ153	15K	1	
R418		ERD25TJ103	10K	1	
R419		ERD25TJ333	33K	1	
R420		ERD25TJ472	4.7K	1	
R421		ERD25TJ473	47K	1	
R422		ERD25TJ472	4.7K	1	
R423		ERD25TJ103	10K	1	
R424		ERD25TJ473	47K	1	
R425		ERD25TJ222	2.2K	1	
R426		ERD25TJ102	1K	1	
R427		ERD25TJ224	220K	1	
R429		ERD25TJ223	22K	1	
R430		ERD25TJ333	33K	1	
R431		ERD25TJ561	560	1	
R432		ERQ12AJ560	Metal 56	1	
R433		ERD25TJ4R7	4.7	1	
R434		ERD25TJ393	39K	1	
R435		ERD25TJ332	3.3K	1	
R436		ERD25TJ123	12K	1	
R438,439		ERD25TJ393	39K	2	
R440		ERD25TJ332	3.3K	1	
R441		ERD25TJ471	470	1	
R442		ERD25TJ272	2.7K	1	
R443		ERD25TJ103	10K	1	
R444		ERD25TJ333	33K	1	
R445		ERD25TJ221	220	1	
R446		ERD25TJ333	33K	1	
R447		ERD25TJ392	3.9K	1	
R448		ERD25TJ333	33K	1	
R451		ERD25TJ103	10K	1	
R452		ERD25TJ333	33K	1	
R453		ERD25TJ223	22K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R454		ERD25TJ183	18K	1	
R455,456		ERD25TJ103	10K	2	
R460		ERD25TJ103	10K	1	
R481		ERD25TJ332	3.3K	1	
			Capacitors		
C401		ECKW1H681KB	Ceramic 50V 680P	1	
C402		ECEA0JS330E	Electrolytic 6V 33	1	
C403,404		ECEA1CS100B	Electrolytic 16V 10	2	
C405		ECQM1H333KZW	Myler 50V 0.033	1	
C406		ECKW1H103PF	Ceramic 50V 0.01	1	
C407		ECEA1CS100B	Electrolytic 16V 10	1	
C408		ECKR1H102KB	Ceramic 50V 0.001	1	
C410		ECQM1H562KZ3	Myler 50V 0.0056	1	
C411		ECEA1HS010E	Electrolytic 50V 1	1	
C412		ECEA1CS100B	Electrolytic 16V 10	1	
C413		ECEA1CS100E	Electrolytic 16V 10	1	
C414		ECQM1H274KZW	Myler 50V 0.27	1	
C415,416		ECEA1CS100B	Electrolytic 16V 10	2	
C417		ECEA0JS101E	Electrolytic 6V 100	1	
C418		ECEA1CS100E	Electrolytic 16V 10	1	
C419		ECKR1H103PF	Ceramic 50V 0.01	1	
C420		ECEA1CS100E	Electrolytic 16V 10	1	
C421		ECEA1CS100B	Electrolytic 16V 10	1	
C422		ECEA50ZR22E	Electrolytic 50V 0.22	1	
C423		ECEA1CS100E	Electrolytic 16V 10	1	
C424		ECEA1CS100B	Electrolytic 16V 10	1	
C425		ECEA1CS221E	Electrolytic 16V 220	1	
C426		ECEA1CS470B	Electrolytic 16V 47	1	
C427		ECKR1H103PF	Ceramic 50V 0.01	1	
C429		ECEA1CS470B	Electrolytic 16V 47	1	
C430		ECEA0JS101E	Electrolytic 6V 100	1	
C431		ECQM1H472KZ3	Myler 50V 0.0047	1	
C432		ECQM1H472KZW	Myler 50V 0.0047	1	
C433		ECQF6122KZ	630V 0.0012	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C434		VCV0001	Trimmer 70pF	1	
C436		ECEA1CS470B	Electrolytic 16V 47	1	
C438		ECEA1HS010B	Electrolytic 50V 1	1	
			Coils		
L401		VLQ80W102K	Choke 1mH	1	
L402		VLQ80W821K	Choke 820μH	1	
L403		VLQ80W102K	Choke 1mH	1	
L404		VLT0089	Dummy	1	
			Transformers		
T401		VLT0090A	Oscillation	1	
			Switches		
S401		VSS0036	Slide Switch	1	
S402		VSS0037	Slide Switch	1	
			Connectors		
P41		VJP0089	3 Pin	1	
P42		VJP0090	5 Pin	1	
P43		VJP0091	10 Pin	1	
P44,45		VJP0090	5 Pin	2	
			Miscellaneous		
		VJH0096Z	Check Terminal	3	
		VMX0226	Ceramic Spacer	2	
		VSC0393	Shield Cap	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			HEAD AMPLIFIER, STILL		
			SECTION UNIT		
		VEP0536B	Head Amplifier Printed Circuit Board	1	
		VEP00418A	Still Printed Circuit Board	1	
		VMA3343	Angle	2	
		XTV3+6FFX	Screw	8	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
		HEAD AMPLIFIER PRINTED		
		CIRCUIT BOARD		
		Transistors		
Q501	2SC1359		1	
Q502	2SC828		1	
Q503	2SA719		1	
Q504-507	2SC1317		4	
		Diodes		
D501	MA150		1	
		Integrated Circuits		
IC501	AN6320	IC for Head Switching,	1	
		Amplifier		
		Resistors		
R501	ERD25TJ152	1.5K	1	
R502	ERD25TJ102	1K	1	
R503	ERD25TJ392	3.9K	1	
R504	ERD25TJ123	12K	1	
R505	ERD25TJ183	18K	1	
R506	ERD25TJ562	5.6K	1	
R507	ERD25TJ332	3.3K	1	
R508	ERD25TJ102	1K	1	
R509	ERD25TJ101	100	1	
R510	ERD25TJ681	680	1	
R511	ERD25TJ4R7	4.7	1	
R512	ERD25TJ182	1.8K	1	
R513,514	ERD25TJ392	3.9K	2	
R515	ERD25TJ182	1.8K	1	
R516,517	ERD25TJ470	47	2	
R518	ERD25TJ100	10	1	
R519	ERD25TJ103	10K	1	
R520	ERD25TJ272	2.7K	1	
R521	ERD25TJ681	680	1	
R522	ERD25TJ271	270	1	
R523	ERD25TJ473	47K	1	
R524,525	ERD25TJ182	1.8K	2	
R527	ERD25TJ100	10	1	
R528	ERD25TJ100	10	1	
R529	ERD25TJ393	39K	1	
R530	ERD25TJ473	47K	1	
R531	EVLS6AA00B13	Variable 1K	1	
R532	ERD25TJ822	8.2K	1	
R533	EVLS6AA00B23	Variable 2K	1	
R534	ERD25TJ101	100	1	
R535	ERD25TJ822	8.2K	1	
R536	EVLS6AA00B23	Variable 2K	1	
R537,538	ERD25TJ391	390	2	
R539	ERD25TJ473	47K	1	
		Capacitors		
C501	ECCW1H100FC	Ceramic 50V 10pF	1	
C502	ECCW1H120KC	Ceramic 50V 12pF	1	
C503	ECCW1H100FC	Ceramic 50V 10pF	1	
C504-506	ECKW1H103PF	Ceramic 50V 0.01	3	
C507	ECEA1CS470E	Electrolytic 16V 47	1	
C508	ECQM1H104KZW	Myler 50V 0.1	1	
C509	ECEA1CS470E	Electrolytic 16V 47	1	
C510	ECEA1CS100E	Electrolytic 16V 10	1	
C511	ECEA1HS010E	Electrolytic 50V 1	1	
C512	ECKW1H103PF	Ceramic 50V 0.01	1	
C514	ECV1ZW50X44	Trimmer 1W 50pF	1	
C516	ECV1ZW50X44	Trimmer 1W 50pF	1	
C517	ECKW1H103PF	Ceramic 50V 0.01	1	
C518	ECEA1HS010E	Electrolytic 50V 1	1	
C519	ECEA1CS100E	Electrolytic 16V 10	1	
C520,521	ECKW1H103PF	Ceramic 50V 0.01	2	
C522	ECEA1CS470E	Electrolytic 16V 47	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C523,524		ECKW1H103PF	Ceramic 50V 0.01	2	
C525		ECCW1H150KC	Ceramic 50V 15P	1	
C526		ECKW1H103PF	Ceramic 50V 0.01	1	
C527,528		ECCW1H470JC	Ceramic 50V 47P	2	
C529		ECCW1H330KC	Ceramic 50V 33P	1	
C530		ECQM1H562KZW	Myler 50V 0.0056	1	
			Coils		
L501		VLQ80W101K	100µH	1	
L502		VLQ80W221K	220µH	1	
L503		VLQ80W2R2K	2.2µH	1	
L504		VLQ80W100K	10µH	1	
L505		VLQ80W2R2K	2.2µH	1	
L506,507		VLQ80W220K	22µH	2	
L508		VLQ80W390K	39µH	1	
L509		VLQ80W681K	680µH	1	
			Connectors		
P51,52		VJP0091	10 Pin	2	
			Miscellaneous		
		VJH0096Z	Check Terminal	9	
		VSC0366	Shield Case A	1	
		VSC0367	Shield Case B	1	
		VSC0368	Shield Case C	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			STILL PRINTED CIRCUIT BOARD		
			Integrated Circuits		
IC6401		DN819	T-Flip Flop	1	
IC6402,6403		UPD4013C	D-Flip Flop	2	
IC6404		DN819	T-Flop Flop	1	
			Transistors		
Q6403		2SC1684		1	
Q6404		2SA719		1	
Q6405		2SC1684		1	
Q6406		2SC1847V		1	
Q6407		2SA564		1	
R6408,6409		2SC1684		2	
Q6410		2SA564		1	
Q6411,6412		2SC1684		2	
Q6413-6416		2SA564		4	
Q6417		2SA719		1	
Q6418		2SC1684		1	
			Diodes		
D6401-6404		MA150		4	
D6406		10E1LF		1	
D6407		MA150		1	
C6409-6421		MA150		13	
R6424		MA150		1	
D6426,6427		MA150		2	
			Resistors		
R6406,6407		ERD25TJ103	10K	2	
R6408		ERD25TJ183	18K	1	
R6409-6411		ERD25TJ103	10K	3	
R6412		ERD25TJ153	15K	1	
R6413		ERD25TJ332	3.3K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R6414		ERD25TJ152	1.5K	1	
R6415		ERD25TJ102	1K	1	
R6416		ERD25TJ472	4.7K	1	
R6417		ERD25TJ103	10K	1	
R6418		ERD25TJ152	1.5K	1	
R6419		ERD25TJ333	33K	1	
R6420		ERD25TJ103	10K	1	
R6421		ERD25TJ333	33K	1	
R6422		ERD25TJ333	33K	1	
R6423		ERD25TJ103	10K	1	
R6424		ERD25TJ561	560	1	
R6425		ERD25TJ334	330K	1	
R6426		ERD25TJ683	68K	1	
R6427		ERD25TJ393	39K	1	
R6428		ERD25TJ103	10K	1	
R6429		ERD25TJ223	22K	1	
R6430		ERD25TJ104	100K	1	
R6431		ERD25TJ563	56K	1	
R6432		ERD25TJ153	15K	1	
R6433		ERD25TJ333	33K	1	
R6434,6435		ERD25TJ103	10K	2	
R6436		ERD25TJ473	47K	1	
R6437		ERD25TJ103	10K	1	
R6438		EVLS6AA00B15	Variable 100K	1	
R6439		EVLS3AA00B15	Variable 100K	1	
R6440		ERD25TJ102	1K	1	
R6441		ERD25TJ392	3.9K	1	
R6442		ERD25TJ153	15K	1	
R6443		ERD25TJ102	1K	1	
R6444		ERD25TJ223	22K	1	
R6445		ERD25TJ563	56K	1	
R6446		ERD25TJ334	330K	1	
R6447		ERD25TJ153	15K	1	
R6448		ERD25TJ103	10K	1	
R6449		ERD25TJ562	5.6K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R6450		ERD25TJ102	1K	1	
R6451		EVLS6AA00B15	Variable 100K	1	
R6452		ERD25TJ103	10K	1	
R6453		ERD25TJ153	15K	1	
R6454		ERD25TJ562	5.6K	1	
R6456		ERD25TJ103	10K	1	
R6457		ERD25TJ334	330K	1	
R6458		ERD25TJ473	47K	1	
R6459		ERD25TJ682	6.8K	1	
R6460		ERD25TJ153	15K	1	
R6461		ERD25TJ103	10K	1	
R6462		ERD25TJ183	18K	1	
R6463		ERD25TJ103	10K	1	
R6466		ERD25TJ474	470K	1	
R6467		ERD25TJ473	47K	1	
			Capacitors		
C6402		ECEA16Z33E	Electrolytic 16V 33	1	
C6403		ECEA1CS100B	Electrolytic 16V 10	1	
C6404		ECEA16Z470E	Electrolytic 16V 470	1	
C6405		ECEA50Z2R2E	Electrolytic 50V 2.2	1	
C6406		ECQM1H272KZW	Myler 50V 0.0027	1	
C6407		ECEA1CS100B	Electrolytic 16V 10	1	
C6408		ECQM1H123KZ3	Myler 50V 0.012	1	
C6409		ECQM1H682KZ3	Myler 50V 0.0068	1	
C6410		ECEA1CS100B	Electrolytic 16V 10	1	
C6411		ECQM1H103KZ3	Myler 50V 0.01	1	
C6412		ECQM1H102KZW	Myler 50V 0.001	1	
C6413		ECQM1H102KZ3	Myler 50V 0.001	1	
C6414		ECQM1H334KZW	Myler 50V 0.33	1	
C6415		ECEA1CS470B	Electrolytic 16V 47	1	
C6416		ECQM1H682KZ3	Myler 50V 0.0068	1	
			Coils		
L6401		VLQ80W221K	Peaking 220μH	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Connectors		
P641,642		VJP0091	10 Pin	2	
P643		VJP0090	5 Pin	1	
			Miscellaneous		
		VJH0096Z	Check Terminal	5	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			REGULATOR & TRANSPORT		
			PRINTED CIRCUIT BOARD		
			Transistors		
Q601,602		2SA564		2	
Q603		2SC1684		1	
Q604		2SC1317		1	
Q605		2SC1847V		1	
Q606,607		2SA886V		2	
Q608		2SC1847V		1	
Q609		2SC1317		1	
Q610-612		2SC1684		3	
Q613		2SA564		1	
Q614		2SC644		1	
Q615,616		2SC1684		2	
Q617		2SC2497		1	
Q618		2SC1318		1	
Q619,620		2SC1684		2	
Q621		2SC1317		1	
Q622		2SC2497		1	
Q623		2SA719		1	
Q624		2SC1684		1	
Q625		2SC1847V		1	
Q626-628		2SC1684		3	
Q629		2SC1318		1	
Q630,631		2SC1684		2	
Q632		2SC644		1	
Q633,634		2SC1684		2	
Q635		2SD389		1	
			Diodes		
D601-617		MA150		17	
D618		RD62EB		1	
D619		MA150		1	
D620		10E1LF		1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
D621		MA150		1	
D622		MA150		1	
D623		MA150		1	
D624		10E1LF		1	
D625		1S954		1	
D626		10E1LF		1	
D627,628		MA150		2	
D629		RD62EB		1	
D630		MA150		1	
D632,633		MA150		2	
D635		MA150		1	
D637,638		10E1LF		2	
D639		MA150		1	
D640		VD1222		1	
D641		MA150		1	
D644,645		MA150		2	
			Resistors		
R602		ERD25TJ222	2.2K	1	
R604		ERD25TJ333	33K	1	
R605		ERD25TJ274	270K	1	
R606		ERD25TJ684	680K	1	
R607		ERD25TJ562	5.6K	1	
R608		ERD25TJ273	27K	1	
R608		ERD25TJ333	33K	1	
R609		ERD25TJ103	10K	1	
R610		ERD25TJ333	33K	1	
R611		ERD25TJ274	270K	1	
R612		ERD25TJ684	680K	1	
R613		ERD25TJ562	5.6K	1	
R614		ERD25TJ333	33K	1	
R615		ERD25TJ682	6.8K	1	
R616		ERD25TJ103	10K	1	
R617		ERD25TJ683	68K	1	
R618		ERD25TJ223	22K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R619		ERD25TJ222	2.2K	1	
R620		ERD25TJ153	15K	1	
R621		ERD25TJ332	3.3K	1	
R623		ERD25TJ224	220K	1	
R624		ERD25TJ472	4.7K	1	
R626		ERD25TJ272	2.7K	1	
R627		ERD25TJ102	1K	1	
R628		ERD25TJ332	3.3K	1	
R629		ERD12SJ331	1/2W 330	1	
R631		ERD25TJ332	3.3K	1	
R632		ERD12SJ331	1/2W 330	1	
R633		ERD25TJ102	1K	1	
R634		ERD25TJ272	2.7K	1	
R635		ERD25TJ332	3.3K	1	
R635		ERG1ANJ101	Metal Oxide 1W 100	1	
R636		ERD25TJ332	3.3K	1	
R637,638		ERD25TJ472	4.7K	2	
R639		ERD25TJ102	1K	1	
R640		ERD25TJ223	22K	1	
R641		ERD25TJ683	68K	1	
R642		ERD25TJ103	10K	1	
R643		ERD25TJ683	68K	1	
R644		ERD25TJ223	22K	1	
R645		ERD25TJ103	10K	1	
R646		ERD25TJ222	2.2K	1	
R647		ERD25TJ223	22K	1	
R649		ERD25TJ221	220	1	
R650		ERD25TJ272	2.7K	1	
R651		ERD25TJ103	10K	1	
R652		ERD25TJ683	68K	1	
R654		ERD25TJ683	68K	1	
R655		ERD25TJ221	220	1	
R656		ERD25TJ153	15K	1	
R657		ERD25TJ472	4.7K	1	
R658		ERD25TJ333	33K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R659		ERD25TJ103	10K	1	
R660		ERD12SJ182	1/2W 1.8K	1	
R661		ERD25TJ682	6.8K	1	
R662		ERD25TJ223	22K	1	
R663		ERG3ANJ121	Metal Oxide 3W 120	1	
R664		ERD25TJ152	1.5K	1	
R665		ERD25TJ471	470	1	
R666		ERD25TJ222	2.2K	1	
R668-670		ERD25TJ103	10K	3	
R671		ERD25TJ332	3.3K	1	
R672		ERD12SJ561	1/2W 560	1	
R673		ERD25TJ331	330	1	
R673		ERD25TJ222	2.2K	1	
R674		ERD25TJ332	3.3K	1	
R675		ERD25TJ682	6.8K	1	
R676		ERD12SJ471	1/2W 470	1	
R677		ERD25TJ103	10K	1	
R679		ERD25TJ102	1K	1	
R680		ERD25TJ562	5.6K	1	
R681		ERD25TJ391	390	1	
R682		ERG1ANJ510	Metal Oxide 1W 51	1	
R683		ERD25TJ221	220	1	
R684		ERD25TJ391	390	1	
R685		ERD25TJ333	33K	1	
R686		ERD25TJ102	1K	1	
R687		ERD25TJ223	22K	1	
R688		ERD25TJ474	470K	1	
R689		ERD25TJ392	3.9K	1	
R690		ERD25TJ122	1.2K	1	
R691		ERD25TJ102	1K	1	
R692		ERD25TJ122	1.2K	1	
R693		EVLS6AA00B52	Variable 500	1	
R694		ERD25TJ152	1.5K	1	
R695		ERD12SJ821	1/2W 820	1	
R696		ERD25TJ683	68K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R698		ERD25TJ103	10K	1	
R6100		ERD25TJ333	33K	1	
R6101		ERD25TJ683	68K	1	
R6102		ERD25TJ333	33K	1	
R6103		ERD25TJ332	3.3K	1	
R6104,6105		ERD25TJ223	22K	2	
R6106		ERD25TJ683	68K	1	
R6108		ERD25TJ333	33K	1	
R6109		ERD25TJ562	5.6K	1	
R6110,6111		ERD25TJ683	68K	2	
R6112,6113		ERD25TJ103	10K	2	
R6115		ERD25TJ822	8.2K	1	
R6116		ERD25TJ223	22K	1	
R6118		ERX1ANJ2R2	Metal 1W 2.2	1	
R6119		ERD25TJ560	56	1	
R6120		ERD12SJ182	1/2W 1.8K	1	
			Capacitors		
C601		ECEA1CS100B	Electrolytic 16V 10	1	
C602		ECEA1ES4R7B	Electrolytic 25V 4.7	1	
C603,604		ECKW1H103PF	Ceramic 50V 0.01	2	
C605		ECEA1ES4R7B	Electrolytic 25V 4.7	1	
C606		ECEA1CS100B	Electrolytic 16V 10	1	
C607		ECEA1ES4R7B	Electrolytic 25V 4.7	1	
C608		ECEA1CS221E	Electrolytic 16V 220	1	
C609		ECEA1CS100B	Electrolytic 16V 10	1	
C610		ECEA50ZR15B	Electrolytic 50V 0.15	1	
C611		ECEA1CS220B	Electrolytic 16V 22	1	
C612		ECKW1H103PF	Ceramic 50V 0.01	1	
C613		ECEA1ES470E	Electrolytic 25V 47	1	
C614		ECKW1H271KB	Ceramic 50V 270P	1	
C615		ECEA1CS101E	Electrolytic 16V 100	1	
C618		ECEA50ZR33E	Electrolytic 50V 0.33	1	
C620		ECEA16N3R3B	Electrolytic 16V 3.3	1	
C621		ECEA50ZR68E	Electrolytic 50V 0.68	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
S601-604		QSB0234	Leaf Switch	4	
			Connectors		
P61		VJP0090	5 Pin	1	
P62		VJP0091	10 Pin	1	
P63		VJP1069	12 Pin	1	
P64,65		VJP0091	10 Pin	2	
			Miscellaneous		
		VHN0011	Rivet	6	
		VJH0096Z	Check Terminal	16	
		VMA2630	Support Angle	2	
		VSC0395	Heat Sink	1	
		XYN3+F8FXS	Screw	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			REAR JACK PRINTED CIRCUIT BOARD		
			Integrated Circuits		
IC6701		UPD4069C	Hex Inverter	1	
			Diodes		
D6701		MA150		1	
			Resistors		
R6308		ERD25TJ680	68	1	
R6309		ERD25TJ102	1K	1	
R6701		ERD25TJ125	1.2M	1	
R6702		ERD25TJ563	56K	1	
R6703		ERD25TJ822	8.2K	1	
R6704,6705		ERD25TJ682	6.8K	2	
R6706		ERD25TJ183	18K	1	
R6707		ERD25TJ122	1.2K	1	
R6709		EVLS6AA00B24	Variable 20K	1	
			Capacitors		
C6701		ECCW1H151JC	Ceramic 50V 150P	1	
C6702,6703		ECCW1H561J	Ceramic 50V 560P	2	
C6704		ECEB1CS100	Electrolytic 16V 10	1	
C6705		ECCW1H121JC	Ceramic 50V 120P	1	
			Connectors		
P615		VJP1108	5 Pin	1	
P671		VJP1108	5 Pin	1	
			Miscellaneous		
S6701		ESD14111	Switch	1	
TP6701,6702		VJH23	Check Terminal	2	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			INPUT SWITCH ANGLE UNIT		
R6302		ERD25TJ681	680	1	
R6303		ERD25TJ104	100K	1	
R6315		ERD25TJ472	4.7K	1	
C6306		ECEA50Z4R7E	Electrolytic 50V 4.7	1	
S6303		VST0012	TV/CAMERA Selector Switch	1	
S6309		ESB6020	Push Switch	1	
P602		VJP0090	5 Pin Connector	1	
P603		VJP0094	10 Pin Connector	1	
P604		VJP0093	5 Pin	1	
P644		VJP0092	3 Pin	1	
J6303		VJJ0021	Mic Jack	1	
		VJB00308	TV/CAMERA Selector P.C. Board	1	
		VJB00100	Mic Jack P.C. Board	1	
		VJB00420	Sub Still P.C. Board	1	
		VMA3331	Switch Angle	1	
		XSN26+6FX	Screw	1	
		XYN26+C4FX	Screw	2	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			LEFT SIDE FRAME UNIT		(NV-8610-E)
T6301		ETP66H11E	Power Transformer	1	
		VEK0472	Power Transistor Unit	1	
		VEK0693	RF Converter Unit	1	
		VEK0702	3 Pin Converter for Heater	1	
		VEK0703	Power Switch Angle Unit	1	
		VEK0708	AC Cord Unit	1	
		VEP0168B	Power Supply Printed Circuit Board	1	
		VHN0011	Rivet	1	
		VJF0022	Lead Clamper	1	
S6310		VJF0032	Power Voltage Selector Switch	1	
		VMA3589	Left Side Frame	1	
		VMA3769	Power Switch Angle (A)	1	
		VMA3770	Power Switch Angle (B)	1	
		VMZ0244	Isolation Sheet (B)	1	
		VMZ0267	Isolation Sheet (A)	1	
		WZBV1	Uni Ti Fastener	11	
		XTV3+6FFXS	Screw	3	
		XTV3+8FFXS	Screw	7	
		XTV3+8FFXRS	Screw	2	
		XWC3BF	Sword Tooth Washer	1	
		XYN3+C8FXS	Screw	2	
		XYN4+F8FXS	Screw	3	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			LEFT SIDE FRAME UNIT		(NV-8610-B)
T6301		ETP66H11E	Power Transformer	1	
		VEK0472	Power Transistor Unit	1	
		VEK0689	AC Cord Unit	1	
		VEK0693	RF Converter Unit	1	
		VEK0702	3 Pin Connector for Heater	1	
		VEK0703	Power Switch Unit	1	
		VEP0168B	Power Supply Printed	1	
			Circuit Board		
		VHN0011	Rivet	1	
		VJF0022	Lead Clamper	1	
S6310		VJF0032	Power Voltage Selector	1	
			Switch		
		VMA3589	Left Side Frame	1	
		VMA3769	Power Switch Angle (A)	1	
		VMA3770	Power Switch Angle (B)	1	
		VMZ0244	Isolation Sheet (B)	1	
		VMZ0267	Isolation Sheet (A)	1	
		WZBV1	Uni Ti Fastener	11	
		XTV3+6FFXS	Screw	3	
		XTV3+8FFXS	Screw	87	
		XTV3+8FFXRS	Screw	2	
		XWC3BF	Sword Tooth Washer	1	
		XYN4+F8FXS	Screw	3	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			LEFT SIDE FRAME UNIT		(NV-8610-EO)
T6301		ETP66H12E	Power Transformer	1	
		VEK0472	Power Transistor Unit	1	
		VEK0693	RF Converter Unit	1	
		VEK0702	3 Pin Converter for Heater	1	
		VEK0703	Power Switch Angle Unit	1	
		VEK0708	AC Cord Unit	1	
		VEP0168A	Power Supply Printed	1	
			Circuit Board		
		VHN0011	Rivet	1	
		VJF0022	Lead Clamper	1	
		VMA3589	Left Side Frame	1	
		VMA3769	Power Switch Angle (A)	1	
		VMZ0244	Isolation Sheet (B)	1	
		VMZ0367	Isolation Sheet (A)	1	
		WZBV1	Uni Ti Fastener	9	
		XTV3+6FFXS	Screw	3	
		XTV3+8FFXS	Screw	5	
		XTV3+8FFXRS	Screw	2	
		XWC3BF	Sword Tooth Washer	1	
		XYN4+F8FXS	Screw	3	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
		POWER BUTTON PANEL UNIT		
	LN41YP	L.E.D. Diode (Yellow)	1	D6301
	GL52AR	L.E.D. Diode (Red)	1	D6302
	VGQ0028	Power Button Panel	1	
	VJP0092	3 Pin Connector	1	
	XTV3+10BFX	Screw	2	
		REAR JACK PLATE UNIT		
R6312	ERD25TJ223	Carbon 22K	1	
R6313	ERD25TJ332	Carbon 3.3K	1	
C6301	ECKW1H103PF	Ceramic 50V 0.01	1	
D6303–6305	MA150	Diode	3	
	VHN0011	Rivet	3	
	VJJ0036	Rear Jack Plate	1	
	VJP0094	10 Pin Connector	1	
	VMA2615	Jack Angle	1	
	VME0026	Push Edge	1	
		VIDEO/HEAD AMP CONNECTOR UNIT		
	VJS1021	5 Pin Connector	2	
	VJS1022	10 Pin Connector	1	
	VJS1023	Terminal	20	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
		AUDIO HEAD CONNECTOR UNIT		
	VJS1020	3 Pin Connector	1	
	VJS1023	Terminal	3	
		REAR ANGLE UNIT		
	VEP00419A	Rear Jack Printed Circuit Board	1	
	VHN0011	Rivet	1	
	VJS1038	BNC Connector	2	
	VMA3348	Rear Angle	1	
	VMA3801	Connector Support Angle	1	
	VMZ0245	Rear Jack Plate	1	
	XTV3+6FFXS	Screw	2	
		RF CONVERTER UNIT		
C6808	ECKW1H102PF	Ceramic Capacitor	1	
	QJT0015	Lug	1	
	VEK0309		1	
	VJB00312	Edge Connector P.C. Board	1	
	VJP0090	5 Pin Connector	1	
	VJS1072	Edge Connector	1	
	VMA3334	RF Converter Guide	1	
	VMA3335	RF Converter Guide Cover	1	
	XTV3+6FFXS	Screw	2	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			AC CORD UNIT		
S6301		ESB70134	Power Switch	1	
		VJA0111	AC Power Cord	1	(NV-8610-E,EO)
		VJA0112	AC Power Cord	1	(NV-8610-B only)
		VJF0017	Cord Bushing	1	
		VMA3768	AC Panel (B)	1	
		VMA3771	Power Switch Angle (B)	1	
		VMZ0276	AC Power Cover (C)	1	
		VXU0081	Switch Button	1	
		XTV3+6FFXS	Screw	2	
		XYN3+C6FXS	Screw	2	
			POWER SWITCH ANGLE UNIT		
R6300		EVHCHAK15B15	Tracking VR	1	
S6302		ESB70134	Power Switch	1	
		VMA3342	Power Switch Angle	1	
		VXU0081	Switch Button	1	
		WZBV1	Uni Ti Fastener	1	
		XYN3+C6FXS	Screw	2	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			POWER TRANSISTOR UNIT		
Q6301		2SB512	Power Transistor	1	⚠
P621		VJP0089	3 Pin Connector	1	
		VMA3381	Transistor Support Angle	1	
		VSC0361	Heat Sink Plate	1	
		XTV3+8FFXS	Screw	3	
			MEMORY COUNTER UNIT		
		VDC0014	Counter	1	
		VMA3332	Counter Base Plate	1	
		VST0011	Switch	1	S6307
		XTV3+6FFXS	Screw	2	
		XWC3BF	Washer	2	
		XYN3+C6FXS	Screw	2	
			3 PIN CONNECTOR FOR HEATER		
		VJS1020	3 Pin Connector	1	
		VJS1023	Terminal	2	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
		TIMER SECTION		
	(VEP0691A)	Circuit Board Ass'y	(1)	
D6201	MA1075	Diode,Zener	1	
D6202	MA1130A	Diode,Zener	1	
D6203-6209	MA150	Diode	7	
D6210	GL5AR2	L. E. D	1	
IC6201	MN1430DA	Micro Computer	1	
Q6201,6202	2SC828A	Transistor	2	
Q6203	2SA564A	Transistor	1	
		Resistors		
R6201	EVMHIGA00B15	100K	1	
R6202	ERD12TJ752T	7.5K	1	
R6203	ERD14TJ473T	47K	1	
R6204	ERD14TJ104T	100K	1	
R6205,6206	ERD14TJ752T	7.5K	2	
R6208	ERD14TJ562T	5.6K	1	
R6209	ERD14TJ103T	10K	1	
R6210	ERD14TJ154T	150K	1	
R6211-6217	EXBP88473M	Hybrid Component 47K	7	
R6218-6225	EXBP88473M	Hybrid Component 47K	8	
R6226	ERD14TJ102T	1K	1	
R6227	ERD14TJ223T	22K	1	
		Capacitors		
C6201	ECSF25E1	25V 1	1	
C6202	ECCW1H101KC2	Ceramic 50V 100P	1	
C6203,6204	ECKW1H102KB2	Ceramic 50V 0.001	2	
C6205	ECSF10E10	10V 10	1	
C6206	ECEA25V4R7	Electrolytic 25V 4.7	1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
S6201	VST0015	Lever Switch	1	
S6202	VST0013	Lever Switch	1	
S6203-6207	EVQP1R04K	Push Switch	5	
P6201	VJP0094	10 Pin Connector	1	
	VSZ0009	Indicator	1	
		CRYSTAL CIRCUIT SECTION		
	(VEP00474A)	Crystal Circuit Ass'y	(1)	
	HC-43/U	Crystal Oscillation	1	
	MN6092	IC, Count Down	1	
	ECCW1H102KB2	Ceramic Capacitor	1	
	ECV1ZW30X32	Trimmer	1	
	VFM05ZC300J05	Mica	2	
	VFM05ZC200J05	Mica	1	

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Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			DEMODULATOR		VEP0712C
			ICS		
IC701		AN331		1	
IC702		AN240		1	
			Transistors		
Q701,702		2SC1686		2	
Q703		2SC1687		1	
Q704		2SC1317		1	
Q705		2SC1687		1	
Q706		2SC1684		1	
Q707		2SC828R		1	
Q708		2SA564R		1	
Q709		2SC828R		1	
Q710		2SC1360		1	
			Diodes		
D701-706		OA90G		6	
D707		MA26W		1	
D708		MA26		1	
X703		EFC-A6ROMC3A	Ceramic Diseriminator	1	
			Transformers		
T701		TLI61653		1	
T702		EIV-10S594F-1		1	
T703		EIV-10S594B		1	
T704		EIV-10S594C-1		1	
T705		EIV-10S594E-1		1	
T706		EIV-10S594D-1		1	
T707		EIV-6M412D		1	
T708		EIS-10S570F-1		1	
T709		EIS-10S570E-1		1	
T710		EIV-10S594-1		1	

Ref. No.		Part No.	Part Name & Description		Pcs / Set	Remarks
T711		TLI67390			1	
			Resistors			
R701		ERD25TJ472		4.7K	1	
R702		EVLS6AA00B32	Variable	300	1	
R703		ERD25TJ103		10K	1	
R704		ERD25TJ471		470	1	
R705		ERD25TJ562		5.6K	1	
R706		ERD25TJ122		1.2K	1	
R707		ERD25TJ152		1.5K	1	
R708		ERD25TJ223		22K	1	
R709		ERD25TJ472		4.7K	1	
R711		ERD25TJ471		470	1	
R712		ERD25TJ821		820	1	
R713		ERD25TJ472		4.7K	1	
R714		ERD25TJ822		8.2K	1	
R715		ERD25TJ272		2.7K	1	
R716		ERD25TJ271		270	1	
R717		ERD18FJ101S		100	1	
R718		EVLS6AA00B32	Variable	300	1	
R719		ERD25TJ562		5.6K	1	
R720		ERD25TJ103		10K	1	
R721		ERD25TJ153		15K	1	
R722		ERD25TJ561		560	1	
R723		ERD25TJ391		390	1	
R724		ERD25TJ333		33K	1	
R725		ERD25TJ393		39K	1	
R726		ERD25TJ682		6.8K	1	
R727		EVLS0AA00B53	Variable	5K	1	
R728		ERD25TJ392		3.9K	1	
R729		ERD25TJ681		680	1	
R730		ERD25TJ122		1.2K	1	
R731		ERD25TJ221		220	1	
R732		ERD25TJ101		100	1	
R733		ERD25TJ122		1.2K	1	

Ref. No.		Part No.	Part Name & Description		Pcs / Set	Remarks
R734		ERD25TJ391		390	1	
R735		ERD25TJ331		330	1	
R736		ERD25TJ183		18K	1	
R737		ERD25TJ123		12K	1	
R738		ERD25TJ222		2.2K	1	
R740		EVLS6AA00B53	Variable	5K	1	
R741		ERD25TJ151		150	1	
R742		ERD25TJ332		3.3K	1	
R743		ERD25TJ123		12K	1	
R744		ERD25TJ391		390	1	
R745		ERD25TJ102		1K	1	
R746		ERD25TJ473		47K	1	
R747		ERD25TJ473		47K	1	
R748		ERD25TJ681		680	1	
R750		ERD25TJ183		18K	1	
R751		EVLS6AA00B13	Variable	1K	1	
R752		ERD25TJ223		22K	1	
R753		ERD25TJ222		2.2K	1	
R754		ERD25TJ562		5.6K	1	
R758		ERD25TJ153		15K	1	
R759		ERD25TJ075		75	1	
R760		ERD18F0390S		39	1	
R761		ERD25TJ103		10K	1	
R762		ERD25TJ123		12K	1	
R763		ERD25TJ562		5.6K	1	
R764		ERD25TJ103		10K	1	
R765		ERD25TJ102		1K	1	
R766		ERD25TJ472		4.7K	1	
R767		ERD25TJ822		8.2K	1	
R768		ERD25TJ392		3.9K	1	
R769		ERD25TJ101		100	1	
R770		ERD25TJ561		560	1	

Ref. No.		Part No.	Part Name & Description			Pcs / Set	Remarks
			Capacitors				
C701		ECCW1H120JC	Ceramic	50V	12P	1	
C702		ECCW1H040DC	Ceramic	50V	4P	1	
C703		ECCW1H010CC	Ceramic	50V	1P	1	
C705		ECCW1H120JP	Ceramic	50V	12P	1	
C706		ECCW1H040D	Ceramic	50V	4P	1	
C707		ECEA16V47LE	Electrolytic	16V	47	1	
C708,709		ECKW1H103PF	Ceramic	50V	0.01	2	
C711		ECCW1H101KC	Ceramic	50V	100P	1	
C712,713		ECKW1H103PF	Ceramic	50V	0.01	2	
C714		ECV1ZW40X32	Trimmer	1W	1-40pF	1	
C715,716		ECCW1H220KC	Ceramic	50V	22P	2	
C717		ECEA16V47LE	Electrolytic	16V	47	1	
C718		ECKW1H103PF	Ceramic	50V	0.01	1	
C719		ECCW1H270KP	Ceramic	50V	27P	1	
C720		ECKW1H103PF	Ceramic	50V	0.01	1	
C721		ECEA16V47LE	Electrolytic	16V	47	1	
C722,723		ECKW1H103PF	Ceramic	50V	0.01	2	
C725		ECEA16V101LE	Electrolytic	16V	100	1	
C726		ECCW1H470KP	Ceramic	50V	47P	1	
C727		ECKW1H103PF	Ceramic	50V	0.01	1	
C729		ECEA16V100LE	Electrolytic	16V	10	1	
C730		ECCW1H101K	Ceramic	50V	100P	1	
C731		ECCW1H300J	Ceramic	50V	30P	1	
C732		ECEA10V1000E	Electrolytic	10V	1000	1	
C733		ECQM1H563KZW	Myler	50V	0.056	1	
C734		ECCW1H070D	Ceramic	50V	7P	1	
C735		ECCW1H220D	Ceramic	50V	22P	1	
C736		ECCW1H070D	Ceramic	50V	7P	1	
C737		ECCW1H680KP	Ceramic	50V	68P	1	
C738		ECQM1H473KZW	Myler	50V	0.047	1	
C739		ECEA16V221E	Electrolytic	16V	220	1	
C740		ECQM1H153KZW	Myler	50V	0.015	1	
C741		ECCW1H560K	Ceramic	50V	56P	1	
C742		ECQM1H103KZW	Myler	50V	0.01	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C743		ECEA16N10UE	Electrolytic 16V 10	1	
C744		ECCW1H030D	Ceramic 50V 3P	1	
C745,746		ECKW1H103PF	Ceramic 50V 0.01	2	
C747		ECQM1H563KZW	Myler 50V 0.056	1	
C748		ECCW1H560KP	Ceramic 50V 56P	1	
C749		ECCW1H150DC	Ceramic 50V 15P	1	
C750,751		ECKW1H103PF	Ceramic 50V 0.01	2	
C752		ECCW1H820KP	Ceramic 50V 82P	1	
C753		ECCW1H070P	Ceramic 50V 7P	1	
C754,755		ECE2103PF	Ceramic 0.01	2	
C756-758		ECKW1H103PF	Ceramic 50V 0.01	3	
C759		ECCW1H150K	Ceramic 50V 15P	1	
C760-762		ECE2222PF	Ceramic 0.0022	3	
C765		ECEA16V221E	Electrolytic 16V 220	1	
C766		ECQM1H103KZW	Myler 50V 0.01	1	
C769		ECE2222PF	Ceramic 0.0022	1	
C770		ECKW1H103PF	Ceramic 50V 0.01	1	
C771-773		ECEA16N10UE	Electrolytic 16V 10	1	
C774		ECEA25V4R7LE	Electrolytic 25V 4.7	1	
C775		ECEA16V100LE	Electrolytic 16V 10	1	
C776		ECQM1H103KZW	Myler 50V 0.01	1	
C777		ECKW1H103PF	Ceramic 50V 0.01	1	
			Coils		
L701		LR8E2R2KCK02	Choke 2.2μH	1	
L702		LR8E8R2KCK02	Choke 8.2μH	1	
L703		LR8E6R8KCK02	Choke 6.8μH	1	
L704		LR8E1R0KCK02	Choke 1μH	1	
L705		LR8E8R2KCK02	Choke 8.2μH	1	
L706		LR8E330JCK02	Choke 33μH	1	
L707		LR8E4R7KCK02	Choke 4.7μH	1	
L708		LR8E8R2KCK02	Choke 8.2μH	1	
L709		LR8E6R8KCK02	Choke 6.8μH	1	
L710		LR8E390KCK02	Choke 39μH	1	
L711		LR8E330KCK02	Choke 33μH	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
L712		LR8E8R2KCK02	8.2μH	1	
L713		LR8E1R0KCK02	1μH	1	
L714		LR8E8R2KCK02	8.2μH	1	
L715		LR8E1R0KCK02	1μH	1	
L716		LR8E8R2KCK02	8.2μH	1	
L717		LR8E6R8KCK02	6.8μH	1	
FL701		FB4R43CLV4103	L. C. Trap	1	

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Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			DEMODULATOR		VEP0712D
			ICS		
IC701		AN331		1	
IC702		AN240		1	
			Transistors		
Q701,702		2SC1686		2	
Q703		2SC1687		1	
Q704		2SC1317		1	
Q705		2SC1687		1	
Q706		2SC1684		1	
Q707		2SC828R		1	
Q708		2SA564R		1	
Q709		2SC828R		1	
Q710		2SC1360		1	
			Diodes		
D701-706		OA90G		6	
D707		MA26W		1	
D708		MA26		1	
X701		EFC-A33R40M1	Ceramic Diseriminator	1	
X703		EFC-A5R5MC3A	Ceramic Diseriminator	1	
			Transformers		
T701		TLI61653		1	
T702		EIV-10S594F-1		1	
T703		EIV-10S594B		1	
T704		EIV-10S594C-1		1	
T705		EIV-10S594E-1		1	
T706		EIV-10S594D-1		1	
T707		EIV-6M412D		1	
T708		EIS-10S570F-1		1	
T709		EIS-10S570E-1		1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
T710		EIV-10S594A-1		1	
T711		TLI67390		1	
			Resistors		
R701		ERD25TJ472	4.7K	1	
R702		EVLS6AA00B32	Variable 300	1	
R703		ERD25TJ103	10K	1	
R704		ERD25TJ471	470	1	
R705		ERD25TJ562	5.6K	1	
R706		ERD25TJ122	1.2K	1	
R707		ERD25TJ152	1.5K	1	
R708		ERD25TJ223	22K	1	
R709		ERD25TJ472	4.7K	1	
R711		ERD25TJ471	470	1	
R712		ERD25TJ821	820	1	
R713		ERD25TJ472	4.7K	1	
R714		ERD25TJ822	8.2K	1	
R715		ERD25TJ272	2.7K	1	
R716		ERD25TJ271	270	1	
R717		ERD18FJ101S	100	1	
R718		EVLS6AA00B32	Variable 300	1	
R719		ERD25TJ562	5.6K	1	
R720		ERD25TJ103	10K	1	
R721		ERD25TJ153	15K	1	
R722		ERD25TJ561	560	1	
R723		ERD25TJ391	390	1	
R724		ERD25TJ333	33K	1	
R725		ERD25TJ393	39K	1	
R726		ERD25TJ682	6.8K	1	
R727		EVLS0AA00B53	Variable 5K	1	
R728		ERD25TJ392	3.9K	1	
R729		ERD25TJ681	680	1	
R730		ERD25TJ222	2.2K	1	
R731		ERD25TJ151	150	1	
R732		ERD25TJ101	100	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R733		ERD25TJ122	1.2K	1	
R734		ERD25TJ391	390	1	
R735		ERD25TJ331	330	1	
R736		ERD25TJ183	18K	1	
R737		ERD25TJ123	12K	1	
R738		ERD25TJ222	2.2K	1	
R740		EVLS6AA00B53	Variable 5K	1	
R741		ERD25TJ151	150	1	
R742		ERD25TJ332	3.3K	1	
R743		ERD25TJ123	15K	1	
R744		ERD25TJ391	390	1	
R745		ERD25TJ102	1K	1	
R746		ERD25TJ473	47K	1	
R747		ERD25TJ473	47K	1	
R748		ERD25TJ681	680	1	
R750		ERD25TJ183	18K	1	
R751		EVLS6AA00B13	Variable 1K	1	
R752		ERD25TJ223	22K	1	
R753		ERD25TJ222	2.2K	1	
R754		ERD25TJ562	5.6K	1	
R758		ERD25TJ333	33K	1	
R759		ERD25TJ750	75	1	
R760		ERD18F0390S	39	1	
R761		ERD25TJ103	10K	1	
R762		ERD25TJ123	12K	1	
R763		ERD25TJ562	5.6K	1	
R764		ERD25TJ103	10K	1	
R765		ERD25TJ102	1K	1	
R766		ERD25TJ152	1.5K	1	
R767		ERD25TJ822	8.2K	1	
R768		ERD25TJ392	3.9K	1	
R769		ERD25TJ101	100	1	
R770		ERD25TJ561	560	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Capacitors		
C701		ECCW1H120JC	Ceramic 50V 12P	1	
C702		ECCW1H060DC	Ceramic 50V 6P	1	
C703		ECCW1H010CC	Ceramic 50V 1P	1	
C705		ECCW1H120JP	Ceramic 50V 12P	1	
C706		ECCW1H040D	Ceramic 50V 4P	1	
C707		ECEA16V47LE	Electrolytic 16V 47	1	
C708,709		ECKW1H103PF	Ceramic 50V 0.01	2	
C711		ECCW1H101KC	Ceramic 50V 100P	1	
C712,713		ECKW1H103PF	Ceramic 50V 0.01	2	
C714		ECV1ZW40X32	Trimmer 1W 1-40pF	1	
C715,716		ECCW1H220KC	Ceramic 50V 22P	2	
C717		ECEA16V47LE	Electrolytic 16V 47	1	
C718		ECKW1H103PF	Ceramic 50V 0.01	1	
C719		ECCW1H270KP	Ceramic 50V 27P	1	
C720		ECKW1H103PF	Ceramic 50V 0.01	1	
C721		ECEA16V47LE	Electrolytic 16V 47	1	
C722,723		ECKW1H103PF	Ceramic 50V 0.01	2	
C725		ECEA16V101LE	Electrolytic 16V 100	1	
C726		ECCW1H470KP	Ceramic 50V 47P	1	
C727		ECKW1H103PF	Ceramic 50V 0.01	1	
C729		ECEA16V100LE	Electrolytic 16V 100	1	
C730		ECCW1H151K	Ceramic 50V 150P	1	
C731		ECCW1H300J	Ceramic 50V 30P	1	
C732		ECEA10V1000E	Electrolytic 10V 1000	1	
C733		ECQM1H563KZW	Myler 50V 0.056	1	
C734		ECCW1H070D	Ceramic 50V 7P	1	
C735		ECCW1H220D	Ceramic 50V 22P	1	
C736		ECCW1H070D	Ceramic 50V 7P	1	
C737		ECCW1H820KP	Ceramic 50V 82P	1	
C738		ECQM1H473KZW	Myler 50V 0.047	1	
C739		ECEA16V221E	Electrolytic 16V 220	1	
C740		ECQM1H153KZW	Myler 50V 0.015	1	
C741		ECCW1H560K	Ceramic 50V 56P	1	
C742		ECQM1H103KZW	Myler 50V 0.01	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C743		ECEA16N010UE	Electrolytic 16V 1	1	
C744		ECCW1H030D	Ceramic 50V 3P	1	
C745,746		ECKW1H103PF	Ceramic 50V 0.01	2	
C747		ECQM1H563KZW	Myler 50V 0.056	1	
C748		ECCW1H560KP	Ceramic 50V 56P	1	
C749		ECCW1H150DC	Ceramic 50V 15P	1	
C750,751		ECKW1H103PF	Ceramic 50V 0.01	2	
C752		ECCW1H820KP	Ceramic 50V 82P	1	
C753		ECCW1H070P	Ceramic 50V 7P	1	
C754,755		ECE2103PF	Ceramic 0.01	2	
C756-758		ECKW1H103PF	Ceramic 50V 0.01	3	
C759		ECCW1H120K	Ceramic 50V 12P	1	
C760-762		ECE2222PF	Ceramic 0.0022	3	
C763		ECCW1H040PE	Ceramic 50V 4P	1	
C765		ECEA16V221E	Electrolytic 16V 220	1	
C766		ECQM1H103KZW	Myler 50V 0.01	1	
C769		ECE2222PF	Ceramic 0.0022	1	
C770		ECKW1H103PF	Ceramic 50V 0.01	1	
C771-773		ECEA16N10UE	Electrolytic 16V 10	3	
C774		ECEA25V4R7LE	Electrolytic 25V 4.7	1	
C775		ECEA16V100LE	Electrolytic 16V 10	1	
C776		ECQM1H103KZW	Myler 50V 0.01	1	
C777		ECKW1H103PF	Ceramic 50V 0.01	1	
			Coils		
L701		LR8E2R2KCK02	Choke 2.2μH	1	
L702		LR8E8R2KCK02	Choke 8.2μH	1	
L703		LR8E6R8KCK02	Choke 6.8μH	1	
L704		LR8E1R0KCK02	Choke 1μH	1	
L705		LR8E8R2KCK02	Choke 8.2μH	1	
L706		LR8E330JCK02	Choke 33μH	1	
L707		LR8E4R7KCK02	Choke 4.7μH	1	
L708		LR8E8R2KCK02	Choke 8.2μH	1	
L709		LR8E6R8KCK02	Choke 6.8μH	1	
L710		LR8E390KCK02	Choke 39μH	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
L711		LR8E220KCK02	Choke 22μH	1	
L712		LR8E8R2KCK02	Choke 8.2μH	1	
L713		LR8E1R0KCK02	Choke 1μH	1	
L714		LR8E8R2KCK02	Choke 8.2μH	1	
L715		LR8E1R0KCK02	Choke 1μH	1	
L716		LR8E8R2KCK02	Choke 8.2μH	1	
L717		LR8E6R8KCK02	Choke 6.8μH	1	
FL701		FB4R43CLV4103	L.C.Trap	1	

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Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
					VEQ0175D
1		VXA0743A	ANTENNA SWITCH HOLDER	1	
2		VXU0081	SWITCH BUTTON	1	
4		ENCSLL02AD12J	ANTENNA SWITCH LEVER A	1	
5		VMB0431	ANTENNA INDICATOR SPRING	1	
6		VML0599	ANTENNA SWITCH INDICATOR	1	
7		ENCBRL04AD12J	ANTENNA SWITCH BASE UNIT	1	
8		ENCBRL06AD12	ANTENNA ANGLE	1	
9		VMA2640	ANTENNA SWITCH WASHER	1	
10		ESE364	ANTENNA SWITCH	1	
11		VEP0712C	VIF PRINT ASS'Y	1	
12		ENCCHUA001D01	TUNER ANGLE UNIT	1	
13		VDB0358	RIVET	2	
14		ENCSLL03AD12J	ANTENNA SWITCH LEVER B	1	
15		ENCSLL04AD12J	ANTENNA SWITCH LEVER (C)	1	
			UNIT		
16		ENCBRL05AD12	TUNER ANGLE	1	
17		TNV87401F2	UHF TUNER	1	
18		VEP0718B	SELECTION CIRCUIT	1	
19		ENCCCRA005D	5P CONNECTOR	1	
20		ENPD705	ANTENNA UNIT	1	
21		ENCCCRA004D	5P CONNECTOR ASS'Y	1	
22		ENCWKPA004D	IF CABLE	1	
23		VGK0476A	ANTENNA INDICATOR	1	
			DECORATION		

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Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
					VEQ0174D
1		VXA0749A	ANTENNA SWITCH HOLDER	1	
2		VXU0081	SWITCH BUTTON	1	
4		ENCSLL02AD12J	ANTENNA SWITCH LEVER A	1	
5		VMB0431	ANTENNA INDICATOR SPRING	1	
6		VML0599	ANTENNA SWITCH INDICATOR	1	
7		ENCBR04AD12J	ANTENNA SWITCH BASE UNIT	1	
8		ENCBRL06AD12	ANTENNA ANGLE	1	
9		VMA2640	ANTENNA SWITCH WASHER	1	
10		ESE364	ANTENNA SWITCH	1	
11		VEP0712D	VIF PRINT ASS'Y	1	
12		ENCCHUA001D01	TUNER ANGLE UNIT	1	
13		VDB0358	RIVET	2	
14		ENCSLL08AD12J	ANTENNA SWITCH LEVER B	1	
15		ENCSLL04AD12J	ANTENNA SWITCH LEVER (C)	1	
			UNIT		
16		ENCBRL05AD12	TUNER ANGLE	1	
17		TNV77401F2	VHF/UHF CONBINATION TUNER	1	
18		VEP0731A	SELECTION CIRCUIT	1	
19		ENCCCRA002D	10P CONNECTOR	1	
20		ENPD704	ANTENNA UNIT	1	
21		ENCCCRA004D	5P CONNECTOR ASS'Y	1	
22		ENCWKPA004D	IF CABLE	1	
23		VGK0476A	ANTENNA INDICATOR	1	
			DECORATION		

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Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
					VEQ0176D
1		VXA0749A	ANTENNA SWITCH HOLDER	1	
2		VXU0081	SWITCH BUTTON	1	
4		ENCSLL02AD12J	ANTENNA SWITCH LEVER A	1	
5		VMB0431	ANTENNA INDICATOR SPRING	1	
6		VML0599	ANTENNA SWITCH INDICATOR	1	
7		ENCBR04AD12J	ANTENNA SWITCH BASE UNIT	1	
8		ENCBRL06AD12	ANTENNA ANGLE	1	
9		VMA2640	ANTENNA SWITCH WASHER	1	
10		ESE364	ANTENNA SWITCH	1	
11		VEP0712D	VIF PRINT ASS'Y	1	
12		ENCCHUA001D01	TUNER ANGLE UNIT	1	
13		VDB0358	RIVET	2	
14		ENCSLL03AD12J	ANTENNA SWITCH LEVER B	1	
15		ENCSLL04AD12J	ANTENNA SWITCH LEVER (C) UNIT	1	
16		ENCBRL05AD12	TUNER ANGLE	1	
17		TNV77432F2	VHF/UHF CONBINATION TUNER	1	
18		VEP0734	SELECTION CIRCUIT	1	
19		ENCCCRA002D	10P CONNECTOR	1	
20		ENPD704	ANTENNA UNIT	1	
21		ENCCCRA004D	5P CONNECTOR ASS'Y	1	
22		ENCWKPA004D	IF CABLE	1	
23		VGK0476A	ANTENNA INDICATOR DECORATION	1	

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Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			SELECTION UNIT		VEQ0152S
1		ENCBDP04HM	FRONT PANEL	1	
2		ENCSEC03AM	TRANSPARENT PLATE	1	
3		ENCBND01A	LEAD TIE	1	
4		ENCBTS04BM	BUTTON	8	
5		ENCSHS01GM	PUSH SHAFT	8	
6		ENCSSA03AM	EASEMENT PLATE	8	
7		ENCBPC11CM	PRINTED CIRCUIT BOARD	1	
8		ENCCCRA006DB	CONNECTOR-10PA	1	
9		ENCCPR01DM	CONTACT POINT	8	
10		ENCCSA01GM	EARTH CONTACT	8	
11		EC1G0RI	ELECTROLYTIC CAPACITOR	8	
12		MA161	DIODE	8	
13		EWEU2A010B24	PRESET VARIABLE RESISTOR	8	
14		ENCRNB01FM	FILM TUNING WHEEL	8	
15		ERD25TJ681	CARBON FILM RESISTOR	1	
16		TLG113	L.E.D.	8	
17		XNB20B	NUT M2	1	
18		ENCHLHA03AM	BRACKET	1	
19		ENCSLP03AM	STOPPER PLATE	1	
20		ENCSPC01BM	COIL SPRING	1	
21		ENCSEE01AM	INSULATION SHEET	1	
22		SWGA001PB	MAGIC SWITCH	1	
23		XTN3+6CFX	SCREW	6	
24		ENCHNGA001D	HINGE ASS'Y	2	
25		ENCSEC04FM	INDICATOR PLATE	1	

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Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			SELECTION UNIT		VEQ0151S
1		ENCBDP04HM	FRONT PANEL	1	
2		ENCSEC03AM	TRANSPARENT PLATE	1	
3		ENCBND01A	LEAD TIE	1	
4		ENCBTS04BM	BUTTON	8	
5		ENCSHS01GM	PUSH SHAFT	8	
6		ENCSSA03AM	EASEMENT PLATE	8	
7		ENCBPC10CM	PRINTED CIRCUIT BOARD	1	
8		ENCCCRA001DB	CONNECTOR-10PA	1	
9		ENCCPR01DM	CONTACT POINT	8	
10		ENCCSA01GM	EARTH CONTACT	8	
11		EC1GORI	ELECTROLYTIC CAPACITOR	8	
12		MA161	DIODE	8	
13		EWEU2A010B24	PRESET VARIABLE RESISTOR	8	
14		ENCRNB01EM	FINE TUNING WHEEL	8	
15		ERD25TJ681	CARBON FIIM RESISTOR	1	
16		TLG113	L.E.D.	8	
17		XNB20B	NUT M2	1	
18		ENCHLHA03DM	BRACKET	1	
19		ENCSLP03AM	STOPPER PLATE	1	
20		ENCSPC01BM	COIL SPRING	1	
21		ENCCSC01CM	CONTACT	1	
22		ENCRNS01BM	BAND SHAFT	8	
23		ENCSEZ01AM	INSULATION SHEET	1	
24		SWGA001PB	MAGIC SWITCH	1	
25		XTN3+6CFX	SCREW	6	
26		ENCHNGA001D	HINGE ASS'Y	2	
27		ENCSEC04FM	INDICATOR PLATE	1	

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Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			SELECTION UNIT		VEQ0176S
1		ENCBDP04HM	FRONT PANEL	1	
2		ENCSEC08AM	TRANSPARENT PLATE	1	
3		ENCBND01A	LEAD TIE	1	
4		ENCBTS04BM	BUTTON	8	
5		ENCSHS01GM	PUSH SHAFT	8	
6		ENCSSA03AM	ERASEMENT PLATE	8	
7		ENCBPC10CM	PRINTED CIRCUIT BOARD	1	
8		ENCCCRA001DB	CONNECTOR-10PA	1	
9		ENCCPR01DM	CONTACT POINT	8	
10		ENCCSA01GM	EARTH CONTACT	8	
11		EC1GORI	ELECTROLYTIC CAPACITOR	8	
12		MA161	DIODE	8	
13		EWEU2A010B24	PRESET VARIABLE RESISTOR	8	
14		ENCRNB01EM	FINE TUNING WHEEL	8	
15		ERD25TJ681	CARBON FIIM RESISTOR	1	
16		TLG113	L.E.D.	8	
17		XNB20B	NUT M2	1	
18		ENCHLHA03DM	BRACKET	1	
19		ENCSLP03AM	STOPPER PLATE	1	
20		ENCSPC01BM	COIL SPRING	1	
21		ENCCSC01CM	CONTACT	1	
22		ENCRNS01BM	BAND SHAFT	8	
23		ENCSEZ01AM	INSULATION SHEET	1	
24		SWGA001PB	MAGIC SWITCH	1	
25		XTN3+6CFX	SCREW	6	
26		ENCHNGA001D	HINGE ASS'Y	2	
27		ENCSEC04FM	INDICATOR PLATE	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			SELECTION CIRCUIT		VEP0718B
IC7001		µPC574J	Analog IC	1	
			Transistors		
Q7004		2SA720		1	
Q7005		2SC1685		1	
Q7008		2SA564A		1	
Q7009,7010		2SC828		2	
Q7011		2SA564A		1	
			Diodes		
D7002,7003		MA161C/1SS54		2	
D7004		OA91		1	
D7008		MA161C/1SS54		1	
			Resistors		
R7009		ERG25CKF4703	Metal 470K	1	
R7010		ERD12TJ154	1/2W 150K	1	
R7011		ERD25TJ101	100	1	
R7012		ERG1ANJ102C	Metal 1W 1K	1	
R7013		ERG1ANJ391C	Metal 1W 390	1	
R7016		ERD25TJ474	470K	1	
R7017		ERD25TJ103	10K	1	
R7018		ERD25TJ331	330	1	
R7019,7020		ERD25TJ102	1K	2	
R7021		ERD25TJ101	100	1	
R7023		ERD25TJ103	10K	1	
R7024		ERD25TJ102	1K	1	
R7025		ERD25TJ103	10K	1	
R7026		ERD25TJ102	1K	1	
R7027,7028		ERD25TJ103	10K	2	
R7030		ERD25TJ103	10K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Capacitors		
C7002		ECE2221K	Ceramic 220P	1	
C7003-7007		ECEA1G010S	Electrolytic 50V 1	5	
C7010,7011		ECE2103PF	Ceramic 0.01	2	
C7012		ECEA1C470S	Electrolytic 16V 47	1	
C7014		ECEA1C470S	Electrolytic 16V 47	1	
C7016		ECE2103PF	Ceramic 0.01	1	
			Connectors		
P704		CCA003DM2	3 Pin	1	
P705		CCA002DM2	10 Pin	1	
P706,707		UJP0090	5 Pin	2	
			Miscellaneous		
		TAK01AD10BD	Check Pin	6	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			SELECTION CIRCUIT		VEP0731A
IC7001		µPC574J	Analog IC	1	
			Transistors		
Q7001		2SC828A		1	
Q7002,7003		2SA564A		2	
Q7004		2SA720		1	
Q7005		2SC1685		1	
Q7006-7008		2SA564		3	
Q7009,7010		2SC828		2	
Q7011		2SA564A		1	
			Diodes		
D7001		MA1082		1	
D7002,7003		MA161C/1SS54		2	
D7004		OA91		1	
D7005-7007		MA150		3	
D7008		MA161C/1SS54		1	
D7009		MA150		1	
			Resistors		
R7001		ERD25TJ333	33K	1	
R7002		ERD25TJ123	12K	1	
R7003		ERD25TJ104	100K	1	
R7004,7005		ERD25TJ223	22K	2	
R7006		ERD25TJ123	12K	1	
R7007		ERD25TJ103	10K	1	
R7008		ERD25TJ102	1K	1	
R7009		ERG25CKF4703	Metal 470K	1	
R7010		ERD12TJ154	1/2W 150K	1	
R7011		ERD25TJ101	100	1	
R7012		ERG1ANJ102C	Metal 1W 1K	1	
R7013		ERG1ANJ391C	Metal 1W 390	1	
R7014,7015		ERD25TJ103	10K	2	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R7016		ERD25TJ474	470K	1	
R7017		ERD25TJ103	10K	1	
R7018		ERD25TJ331	330	1	
R7019,7020		ERD25TJ102	1K	2	
R7021		ERD25TJ101	100	1	
R7023		ERD25TJ103	10K	1	
R7024		ERD25TJ102	1K	1	
R7025		ERD25TJ103	10K	1	
R7026		ERD25TJ102	1K	1	
R7027,7028		ERD25TJ103	10K	2	
R7029		ERD25TJ474	470K	1	
R7030		ERD25TJ103	10K	1	
R7031		EVNK4AA00B15	Variable 100K	1	
			Capacitors		
C7001		ECE2103PF	Ceramic 0.01	1	
C7002		ECE2221K	Ceramic 220P	1	
C7003-7005		ECEA1G010S	Electrolytic 50V 1	3	
C7006		ECEA1G101S	Electrolytic 50V 100	1	
C7007		ECEA1G010S	Electrolytic 50V 1	1	
C7008-7011		ECE2103PF	Ceramic 0.01	4	
C7012		ECEA1C470S	Electrolytic 16V 47	1	
C7013		ECEA1C100S	Electrolytic 16V 10	1	
C7014		ECEA1C470S	Electrolytic 16V 47	1	
C7016		ECE2103PF	Ceramic 0.01	1	
			Connectors		
P704		CCA003DM2	3 Pin	1	
P705,706		CCA002DM2	10 Pin	2	
P707		UJP0090	5 Pin	1	
			Miscellaneous		
		TAK01AD10BD	Check Pin	6	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			SELECTION CIRCUIT		VEP0734
IC7001		μPC574J	Analog IC	1	
			Transistors		
Q7001		2SD637		1	
Q7002,7003		2SB642		2	
Q7004		2SB644		1	
Q7005		2SD636		1	
Q7006,7007		2SB641		2	
Q7008		2SB642		1	
Q7009,7010		2SD636		2	
Q7011-7014		2SB642		4	
			Diodes		
D7001		MA1082/RD8.2E		1	
D7002,7003		MA161C/1SS54		2	
D7004		OA91		1	
D7005		MA150/1SS54		1	
D7006		MA161C/1SS54		1	
D7007		MA150/1SS54		1	
D7008-7010		MA161C/1SS54		3	
D7011		RD33E/RD30E		1	
D7012		RD5.6E		1	
D7013		RD4.7E/RD5.1E		1	
D7014		RD5.6E		1	
D7015		RD4.7E/RD5.1E		1	
			Resistors		
R7001		ERD25TJ333	33K	1	
R7002		ERD25TJ123	12K	1	
R7003		ERD25TJ104	100K	1	
R7004,7005		ERD25TJ223	22K	2	
R7006		ERD25TJ123	12K	1	
R7007		ERD25TJ103	10K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R7008		ERD25TJ102	1K	1	
R7009		ERG25CKF4703	Metal 470K	1	
R7010		ERD12TJ154	1/2W 150K	1	
R7011		ERD25TJ101	100	1	
R7012		ERG1ANJ102C	Metal 1W 1K	1	
R7013		ERD25TJ391C	390	1	
R7014,7015		ERD25TJ103	10K	2	
R7016		ERD25TJ474	470K	1	
R7017		ERD25TJ103	10K	1	
R7018		ERD25TJ331	330	1	
R7019,7020		ERD25TJ102	1K	2	
R7021		ERD25TJ101	100	1	
R7023		ERD25TJ103	10K	1	
R7024		ERD25TJ102	1K	1	
R7025		ERD25TJ103	10K	1	
R7026		ERD25TJ102	1K	1	
R7027,7028		ERD25TJ103	10K	2	
R7029		ERD25TJ474	470K	1	
R7030		ERD25TJ102	1K	1	
R7031			Variable 100K	1	
R7032		ERD12TJ561	1/2W 560	1	
R7033		ERD25TJ103	10K	1	
R7034		ERD25TJ681	680	1	
R7035,7036		ERD25TJ333	33K	2	
R7037,7038		ERD25TJ103	10K	2	
			Capacitors		
C7001		ECE2103PF	Ceramic 0.01	1	
C7002		ECE2221K	Ceramic 220P	1	
C7003-7005		ECEA1G010S	Electrolytic 50V 1	3	
C7006		ECEA1G101S	Electrolytic 50V 100	1	
C7007		ECEA1G010S	Electrolytic 50V 1	1	
C7008-7011		ECE2103PF	Ceramic 0.01	4	
C7012		ECEA1C470S	Electrolytic 16V 47	1	
C7013		ECEA1C100S	Electrolytic 16V 10	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C7014		ECEA1C47QS	Electrolytic 16V 47	1	
C7017		ECE2103PF	Ceramic 0.01	1	
			Connectors		
P704		CCA003DM2	3 Pin	1	
P705,706		CCA002DM2	10 Pin	2	
P707		UJP0090	5 Pin	1	
			Miscellaneous		
		TAK01AD10BD	Check Pin	7	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			RF CONVERTER		ENC17318 and ENC17319
			Resistors		
R1		ERD18TJ680	68	1	
R2		ERD18TJ471	470	1	
R3		ERD18TJ821	820	1	
R4		ERD18TJ102	1K	1	
R5		ERD18TJ152	1.5K	1	
R6		ERD18TJ100	10	1	
R7		ERD18TJ470	47	1	ENC17318
R7		ERD18TJ151	150	1	ENC17319
R8,9		ERD18TJ151	150	1	ENC17318
R8		ERD18TJ101	100	1	ENC17319
R9		ERD18TJ151	150	1	
R10		ERD18TJ682	6.8K	1	
R11		ERD18TJ181	180	1	ENC17318
R11		ERD18TJ561	560	1	ENC17319
R12		ERD18TJ471	470	1	
R13		ERD18TJ122	1.2K	1	
R14		ERD18TJ392	3.9K	1	
R15		ERD18TJ102	1K	1	
R17		ERD14FJ820	82	1	
VR1		EVNK0AA00B13	Variable 1K	1	
VR2		EVNK4AA00B14	Variable 10K	1	
VR3		EVNK4AA00B15	Variable 100K	1	
			Capacitors		
C1		ECB2150DC	Ceramic 15P	1	
C2		ECB2010CC	Ceramic 1P	1	
C3		ECX2102PE	Feedthrugh 0.001	1	
C4		ECEA1AS470	Electrolytic 10V 47	1	
C5		ECB2100FC	Ceramic 10P	1	
C6		ECX2102PE	Feedthrugh 0.001	1	
C7		ECE2103PF	Ceramic 0.01	1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
C8	ECB2040DC	Ceramic 4P	1	ENC17318
C8	ECB2030DC	Ceramic 3P	1	ENC17319
C9	ECX2102PE	Feedthrugh 0.001	1	
C10	ECE2103PF	Ceramic 0.01	1	
C11	ECX2102PE	Feedthrugh 0.001	1	
C12	ECEA25N4R7	Electrolytic 25V 4.7	1	
C13,14	ECE2070DC	Ceramic 7P	2	
C15	ECEA1CS330	Electrolytic 16V 33	1	
C16	ECEA1HS010	Electrolytic 50V 1	1	
C17	ECE2102PF	Ceramic 0.001	1	
C18	EVCY25473M	Semiconductive 0.047	1	
C19	ECEA1CS100	Electrolytic 16V 10	1	
C20	ECE2103PF	Ceramic 0.01	1	
C21	ECE2221K	Ceramic 220P	1	
C22	ECB2390KC	Ceramic 39P	1	
C23	ECB2470KT	Ceramic 47P	1	
C24	EVCY25473M	Semiconductive 0.047	1	
C25	ECE2101K	Ceramic 100P	1	
C26	ECE2103PF	Ceramic 0.01	1	
C27	ECEA1CS470	Electrolytic 16V 47	1	
C28	ECX2102PE	Feedthrugh 0.001	1	
C30	ECY2020N	Discoidal Feedthrugh 2P	1	
C31	ECY2300K	Discoidal Feedthrugh 30P	1	
C32	ECB2020PE	Ceramic 2P	1	
VC1	ECV12W04X53D	Trimer 1-4pF	1	
L1	LR4H1R0KVA01	Coil 1µH	1	
T1	VLT0093	Transformer	1	
Q1,2	2SC1215R	Transistor	2	
Q3	2SC1317R	Transistor	1	
D1	RD75ED	Zener Diode	1	
D2	1S953	Switching Diode	1	
AM-1	PCBA016V	M.M (FM Oscillator)	1	
U0-1	U0CA001V	UHF Oscillator	1	
	ENCBPC30AV16	Main Print	1	
		Main Print Ass'y		
	ENCCHSA241VW	(ENC17318)	1	
	ENCCHSA251VW	(ENC17319)	1	
	ENCCHU16AV08	Frame	1	
	ENCCHU17AV08	Cover	1	
	ENCVKH0019		1	
	XSS26+4FNS	M2-6 Semus	2	

ORDER NO. VRD-7904-313

Service Manual

Video Cassette Recorder

Panasonic VHS

NV-8610

Vol. 3

Block Diagrams
Schematic Diagrams

HAUER & MÜLLER
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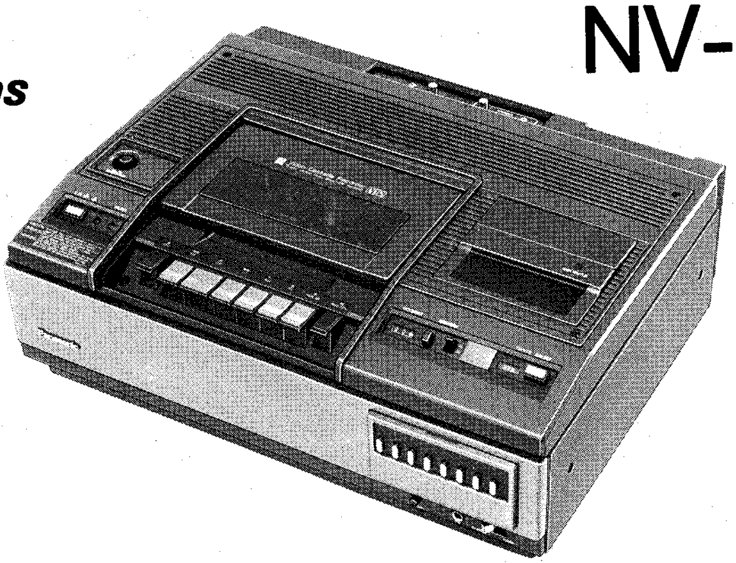
Stader Str. 35, 2800 BREMEN 1
Tel. 0421 / 49 83 51 - 52



SPECIFICATIONS

Power Source:	NV-8610E, B 110V/127V/220V/240V AC, 50Hz NV-8610EO: 220V AC, 50Hz
Power Consumption:	Approx. 39 watts
Television System:	CCIR: 625 lines, 50 fields PAL colour signal
Video Recording System:	2 rotary heads, helical scanning, VHS system azimuth recording Luminance: FM recordings, 3.8–4.8MHz Colour signal: converted subcarrier phase shift recording, 627kHz
Audio Track:	1 track
Tape:	Tape width 12.7mm, super high density tape
Tape Speed:	23.39mm/sec.
Video Track Width:	0.049mm
Video Head Gap Azimuth:	6°
Audio Track Width:	1.0mm
Control Track Width:	0.75mm
Record/Playback Time:	180 min. with NV-E180
FF/REW Time:	Less than 4.5 min. with NV-E180
Horizontal Resolution:	B/W: more than 300 lines Colour: more than 240 lines
Audio Frequency Response:	80 to 10,000Hz
Signal-to-Noise Ratio:	Video: more than 43dB Audio: more than 43dB
Operating temperature:	5°C to 40°C
Operating Humidity:	10% to 75%
Heads:	Video: 2 rotary heads Audio/Control: 1 stationary head Erase: 1 full track erase 1 audio dubbing erase
Inputs:	Video: 1.0Vp-p, 75Ω unbalanced (BNC) Audio: MIC −70dB, 600Ω unbalanced (M6) LINE −20dB, 100kΩ unbalanced (BNC) Pause remote: Short circuited (M2) Camera remote: (M2) TV tuner: E type: VHF ch. 2–12. UHF ch. 21–69 EO type: VHF ch. E2–M1, M2–U9 UHF ch. 21–69 B type: UHF ch. 21–69 75Ω unbalanced (DIN)
Outputs:	Video: 1.0Vp-p, 75Ω unbalanced (BNC) Audio: LINE −6dB, 600Ω unbalanced (BNC) RF converter: UHF ch. 36±3 75Ω unbalanced (DIN)
Weight:	Approx. 16.5kg
Dimensions:	Approx. 485(W)×176(H)×368(D)mm
Standard Accessories:	Video cassette tape, NV-E120×1 DIN-DIN 75Ω coaxial cable, 2m long×1 Remote pause controller, NV-A181, (6m)×1 Dust cover×1
Optional Accessories:	VHS cassette tape NV-E60 (1 hr) NV-E120 (2 hrs) NV-E180 (3 hrs) B/W video camera, WV-460E (Extension cable and wide-angle adaptor lens are also available.) Portable PAL colour camera, WV-3300E

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

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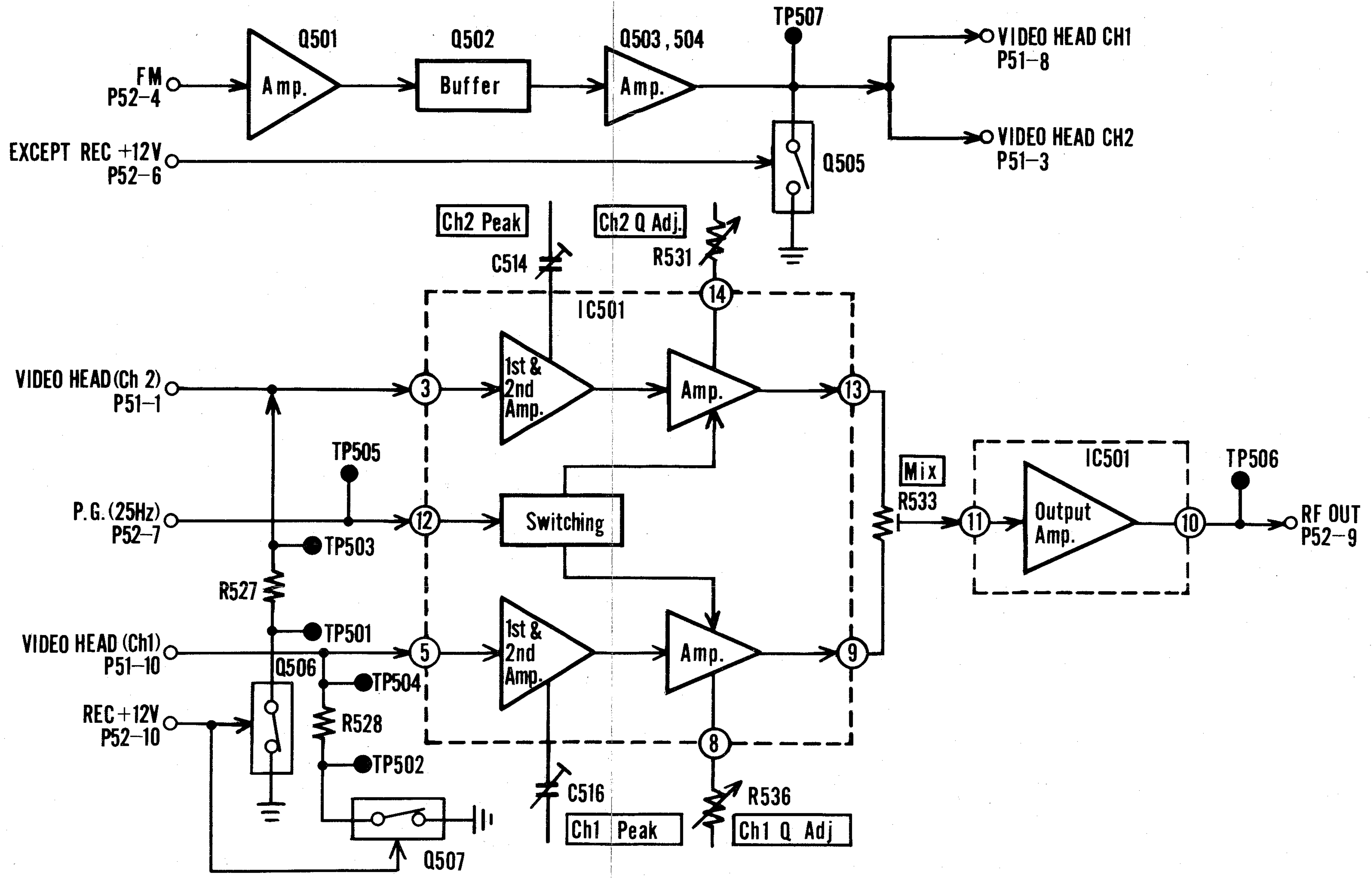
REC & HEAD AMP BLOCK DIAGRAM


Q501
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Buffer
Amp.
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VIDEO HEAD CH2 P51-3
EXCEPT REC +12V P52-6
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Ch2 Q Adj.
C514
R531
14
IC501
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Amp.
13
TP505
P.G. (25Hz) P52-7
12
Switching
Mix
R533
11
IC501
Output Amp.
10
TP506
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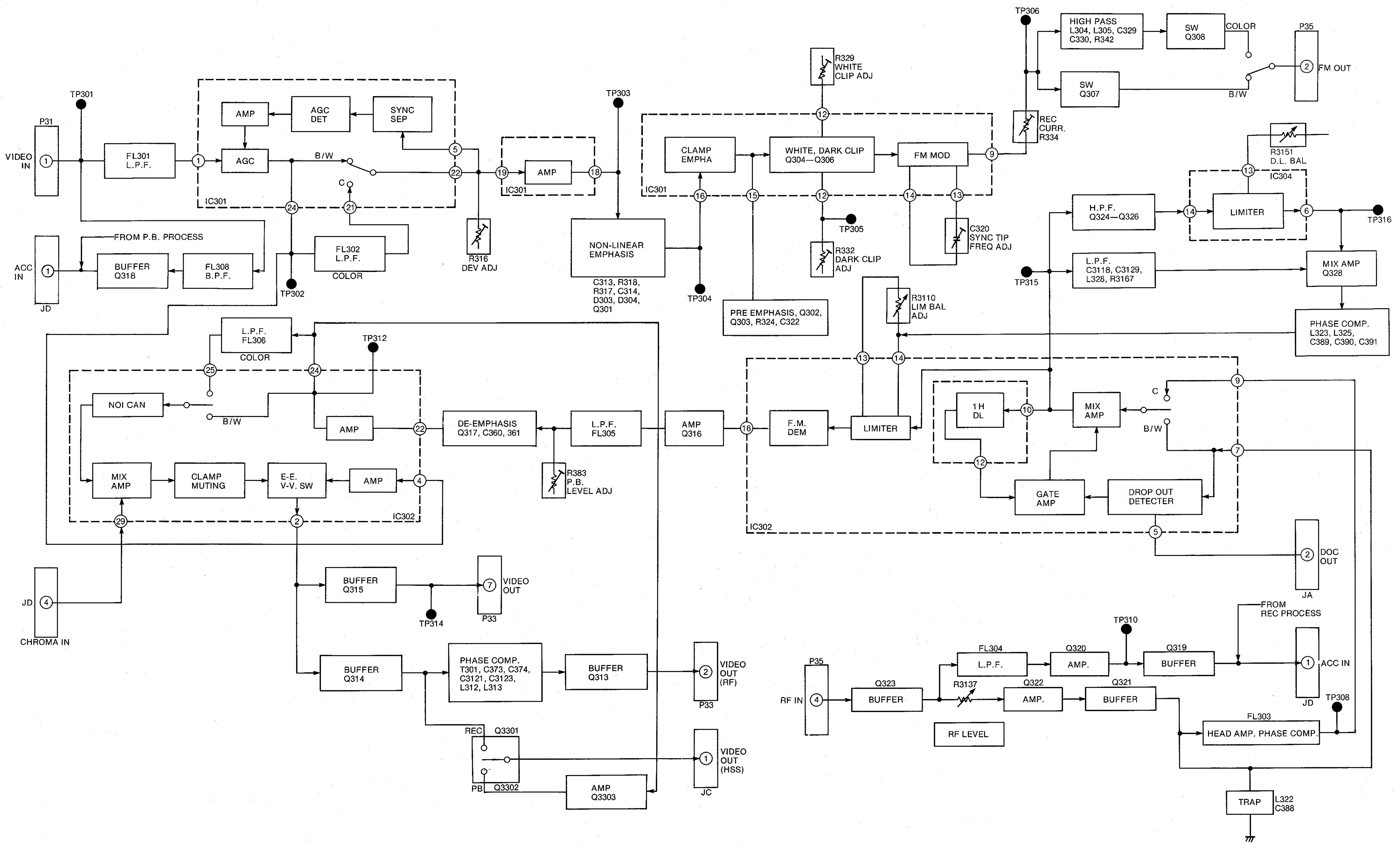
TP503
R527
TP501
VIDEO HEAD (Ch1) P51-10
5
1st & 2nd Amp.
Amp.
9
Q506
TP504
REC +12V P52-10
R528
TP502
8
C516
Ch1 Peak
R536
Ch1 Q Adj
Q507

LUMINANCE PROCESS BLOCK DIAGRAM


TP301
P31
VIDEO IN
FL301 L.P.F.
AMP
AGC DET
SYNC SEP
AGC
B/W
C
IC301
TP303
AMP
IC301
FL302 L.P.F.
COLOR
TP302
R316 DEV ADJ
NON-LINEAR EMPHASIS
C313, R318, R317, C314, D303, D304, Q301
TP304
ACC IN
JD
FROM P.B. PROCESS
BUFFER Q318
FL308 B.P.F.
R329 WHITE CLIP ADJ
CLAMP EMPHA
WHITE, DARK CLIP Q304—Q306
FM MOD
IC301
TP305
R332 DARK CLIP ADJ
C320 SYNC TIP FREQ ADJ
PRE EMPHASIS, Q302, Q303, R324, C322
TP306
HIGH PASS L304, L305, C329 C330, R342
SW Q308
COLOR
SW Q307
B/W
P35
FM OUT
REC CURR. R334
R3151 D.L. BAL
IC304
H.P.F. Q324—Q326
LIMITER
TP316
TP315
L.P.F. C3118, C3129, L328, R3167
MIX AMP Q328
PHASE COMP. L323, L325, C389, C390, C391
R3110 LIM BAL ADJ
L.P.F. FL306
COLOR
TP312
NOI CAN
B/W
AMP
MIX AMP
CLAMP MUTING
E-E. V-V. SW
AMP
IC302
DE-EMPHASIS Q317, C360, 361
L.P.F. FL305
R383 P.B. LEVEL ADJ
AMP Q316
F.M. DEM
LIMITER
1H DL
MIX AMP
C
B/W
GATE AMP
DROP OUT DETECTER
IC302
DOC OUT
JA
JD
CHROMA IN
BUFFER Q315
VIDEO OUT
TP314
P33
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P33
REC
Q3301
PB
Q3302
AMP Q3303
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JC
FROM REC PROCESS
TP310
FL304
L.P.F.
Q320
AMP.
Q319
BUFFER
ACC IN
JD
P35
RF IN
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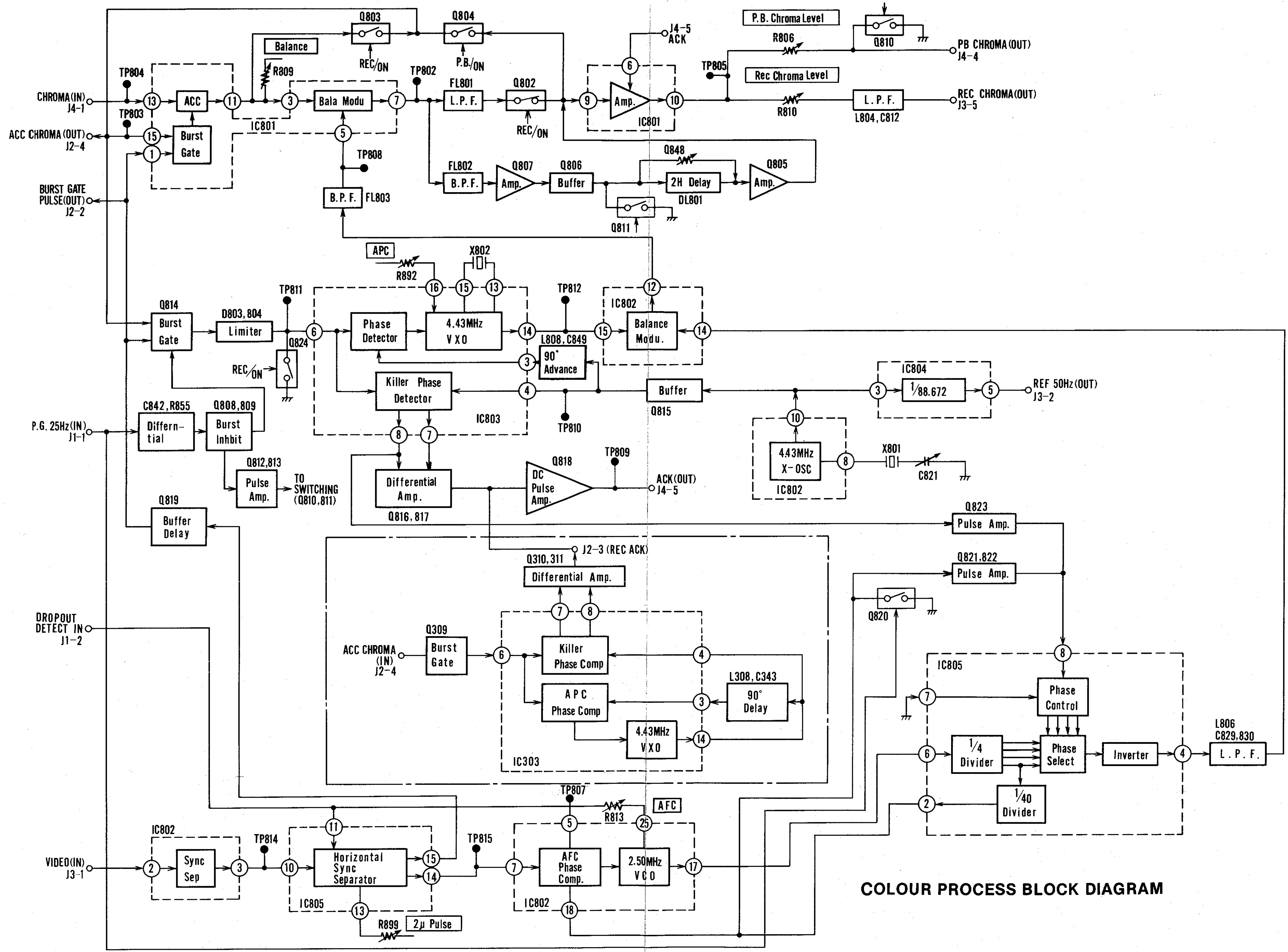
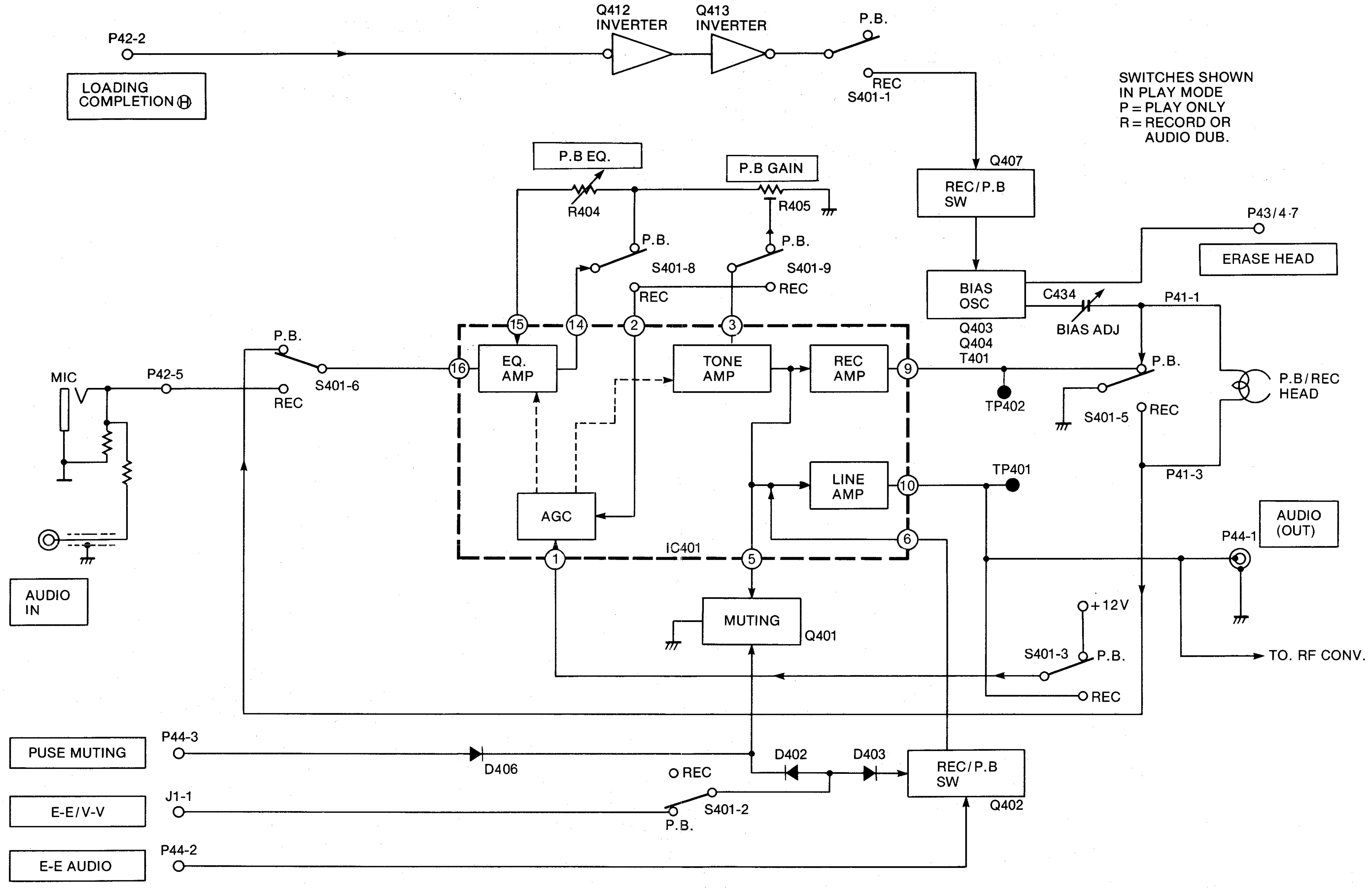
BUFFER
R3137
Q322
AMP.
Q321
BUFFER
TP308
RF LEVEL
FL303
HEAD AMP. PHASE COMP.
TRAP
L322 C388

COLOUR PROCESS BLOCK DIAGRAM


CHROMA(IN) J4-1
ACC CHROMA(OUT) J2-4
BURST GATE PULSE(OUT) J2-2
P.G. 25Hz(IN) J1-1
DROPOUT DETECT IN J1-2
VIDEO(IN) J3-1
TP804
TP803
ACC
Burst Gate
Balance
R809
IC801
Q803
REC/ON
Q804
P.B./ON
TP802
Bala Modu
FL801
L.P.F.
Q802
REC/ON
J4-5 ACK
Amp.
IC801
TP805
P.B. Chroma Level
R806
Q810
PB CHROMA(OUT) J4-4
Rec Chroma Level
R810
L.P.F.
L804, C812
REC CHROMA(OUT) J3-5
TP808
B.P.F. FL803
FL802
B.P.F.
Q807
Amp.
Q806
Buffer
Q848
2H Delay
DL801
Q805
Amp.
Q811
APC
R892
X802
TP811
Q814
Burst Gate
D803, 804
Limiter
Q824
REC/ON
Phase Detector
4.43MHz VXO
TP812
L808, C849
90° Advance
IC802
Balance Modu.
Killer Phase Detector
IC803
TP810
Buffer
Q815
IC804
1/88.672
REF 50Hz(OUT) J3-2
C842, R855
Differn-tial
Q808, 809
Burst Inhbit
Q812, 813
Pulse Amp.
TO SWITCHING (Q810, 811)
Differential Amp.
Q816, 817
Q818
DC Pulse Amp.
TP809
ACK(OUT) J4-5
4.43MHz X-OSC
IC802
X801
C821
Q819
Buffer Delay
Q823
Pulse Amp.
J2-3 (REC ACK)
Q310, 311
Differential Amp.
Q821, 822
Pulse Amp.
Q820
Q309
ACC CHROMA (IN) J2-4
Burst Gate
Killer Phase Comp
APC Phase Comp
L308, C343
90° Delay
4.43MHz VXO
IC303
IC805
Phase Control
1/4 Divider
Phase Select
Inverter
1/40 Divider
L806 C829, 830
L.P.F.
TP807
R813
AFC
IC802
Sync Sep
TP814
Horizontal Sync Separator
IC805
TP815
AFC Phase Comp.
2.50MHz VCO
IC802
R899
2μ Pulse

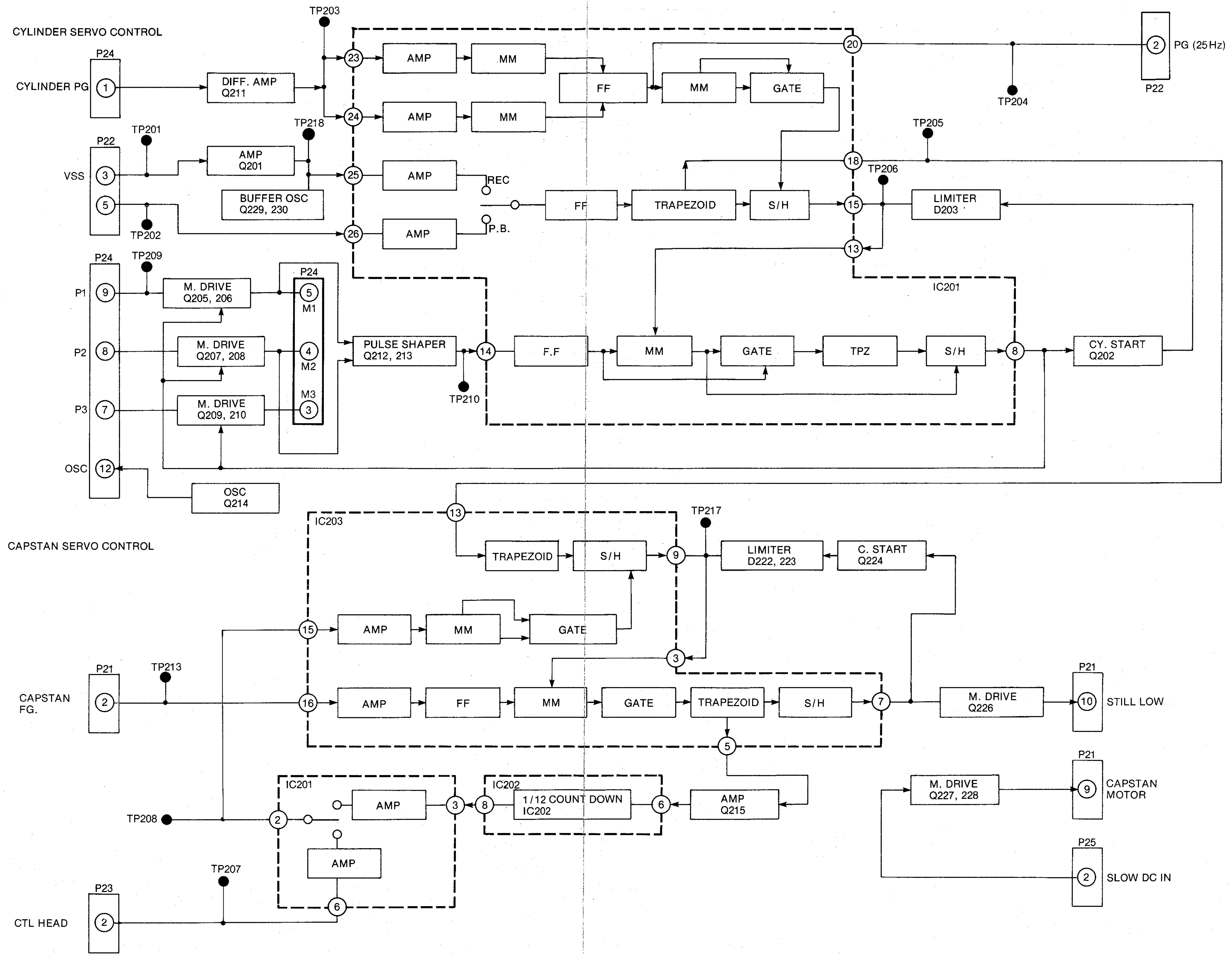
COLOUR PROCESS BLOCK DIAGRAM

AUDIO BLOCK DIAGRAM

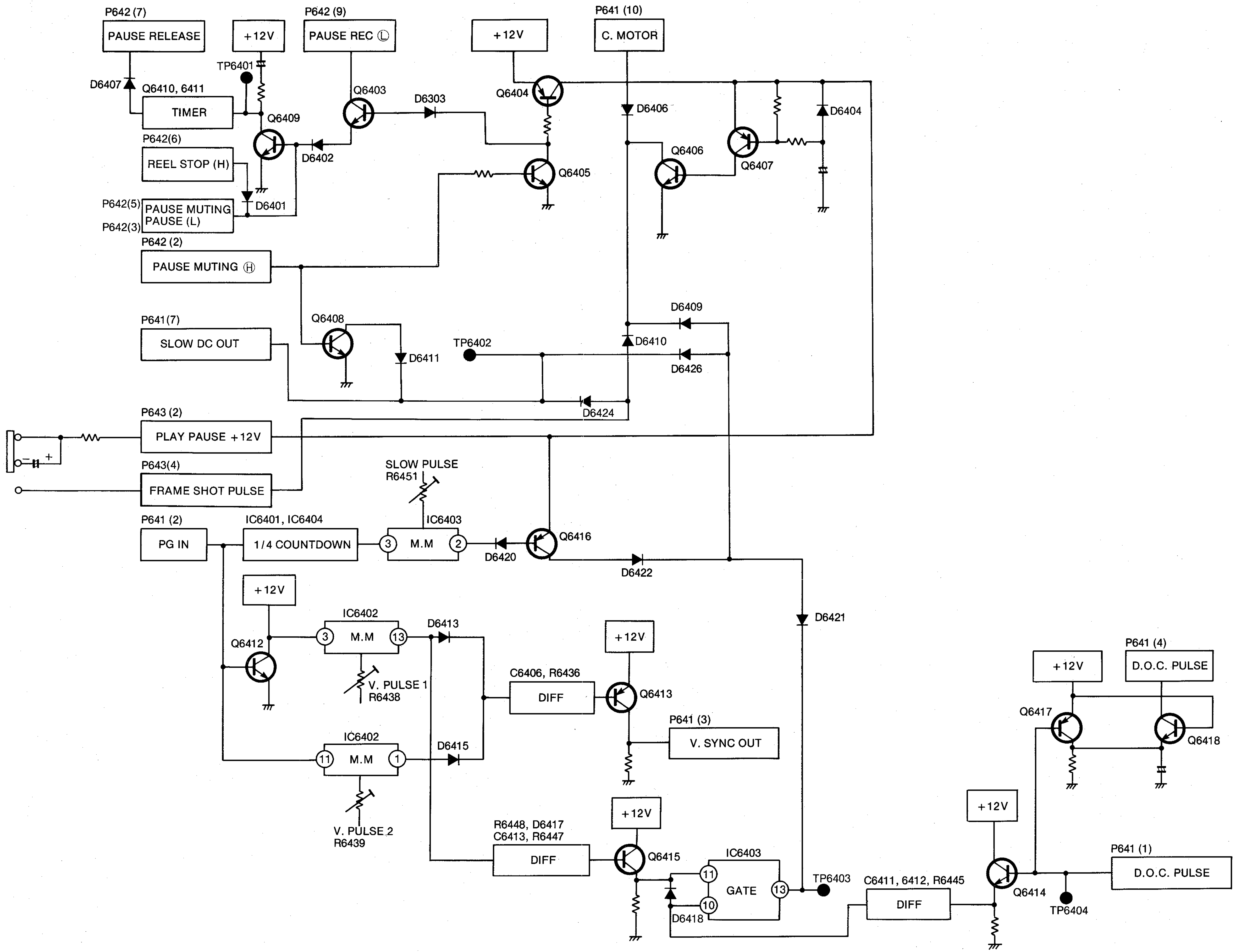

SWITCHES SHOWN
IN PLAY MODE
P = PLAY ONLY
R = RECORD OR
AUDIO DUB.

P42-2
LOADING COMPLETION Ⓗ
Q412 INVERTER
Q413 INVERTER
P.B.
REC
S401-1
Q407
REC/P.B SW
P.B EQ.
R404
P.B GAIN
R405
P.B.
S401-8
P.B.
S401-9
REC
REC
P43/4·7
ERASE HEAD
BIAS OSC
Q403
Q404
T401
C434
BIAS ADJ
P41-1
P.B.
P.B/REC HEAD
S401-5
REC
TP402
P41-3
P.B.
S401-6
REC
MIC
P42-5
AUDIO IN
15
14
2
3
16
EQ. AMP
TONE AMP
REC AMP
9
LINE AMP
10
AGC
6
IC401
1
5
TP401
AUDIO (OUT)
P44-1
MUTING
Q401
+12V
S401-3
P.B.
REC
TO. RF CONV.
PUSE MUTING
P44-3
D406
D402
D403
REC
REC/P.B SW
Q402
E-E/V-V
J1-1
S401-2
P.B.
E-E AUDIO
P44-2

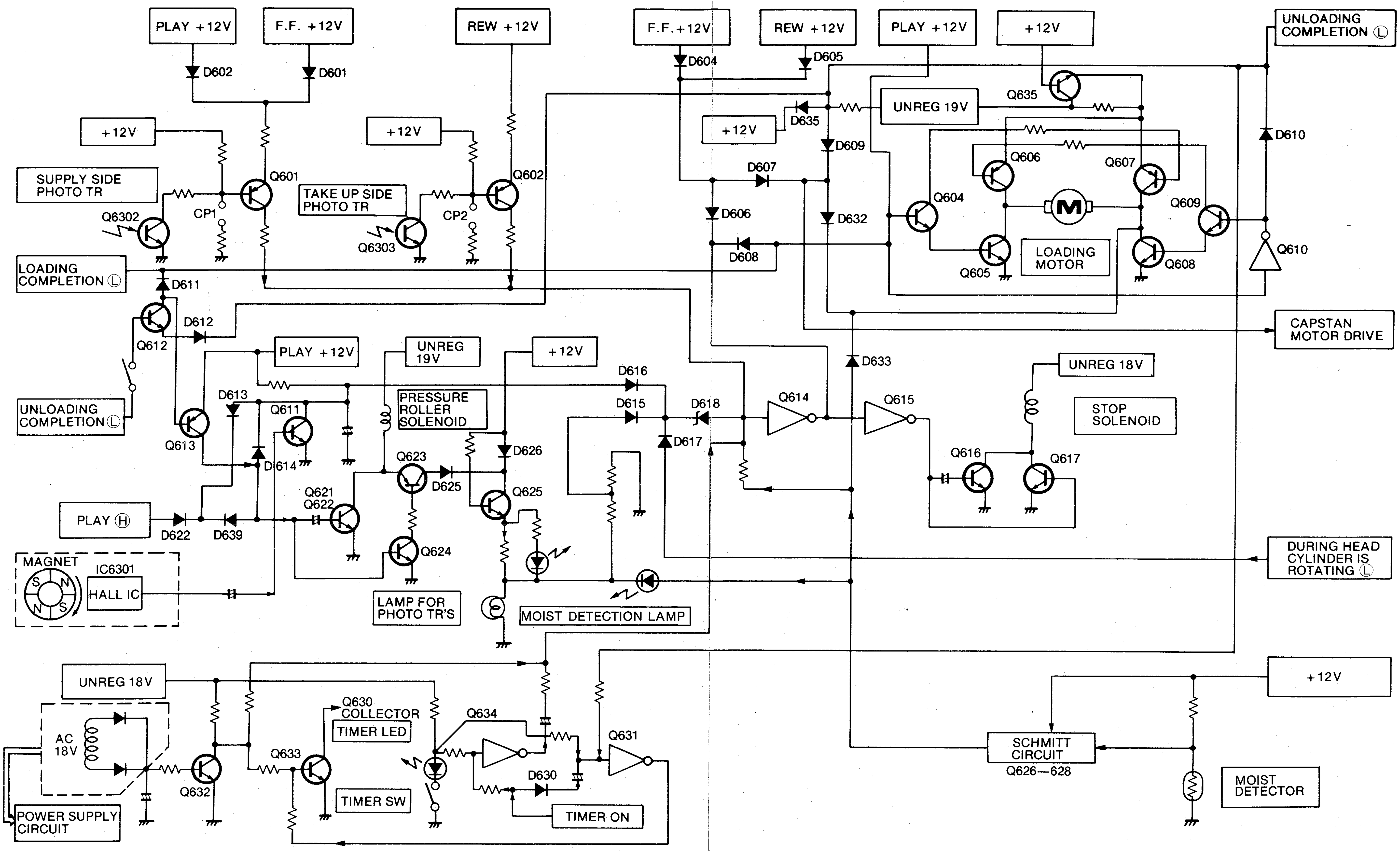
SERVO CONTROL BLOCK DIAGRAM


CYLINDER SERVO CONTROL
CYLINDER PG
P24
1
DIFF. AMP
Q211
TP203
23
24
25
26
AMP
MM
FF
GATE
20
PG (25Hz)
2
P22
TP204
TP201
TP218
P22
VSS
3
5
AMP
Q201
BUFFER OSC
Q229, 230
TP202
REC
P.B.
TRAPEZOID
S/H
18
15
13
TP205
TP206
LIMITER
D203
P24
TP209
P1
P2
P3
9
8
7
M. DRIVE
Q205, 206
M. DRIVE
Q207, 208
M. DRIVE
Q209, 210
P24
5
M1
4
M2
M3
3
PULSE SHAPER
Q212, 213
14
TP210
F.F
MM
GATE
TPZ
S/H
8
IC201
CY. START
Q202
OSC
12
OSC
Q214
CAPSTAN SERVO CONTROL
IC203
13
TRAPEZOID
S/H
9
TP217
LIMITER
D222, 223
C. START
Q224
15
AMP
MM
GATE
3
P21
TP213
CAPSTAN
FG.
2
16
AMP
FF
MM
GATE
TRAPEZOID
S/H
7
M. DRIVE
Q226
P21
10
STILL LOW
5
IC201
AMP
2
3
AMP
6
TP208
IC202
8
1/12 COUNT DOWN
IC202
6
AMP
Q215
M. DRIVE
Q227, 228
P21
9
CAPSTAN
MOTOR
P25
2
SLOW DC IN
TP207
P23
CTL HEAD
2

STILL BLOCK DIAGRAM

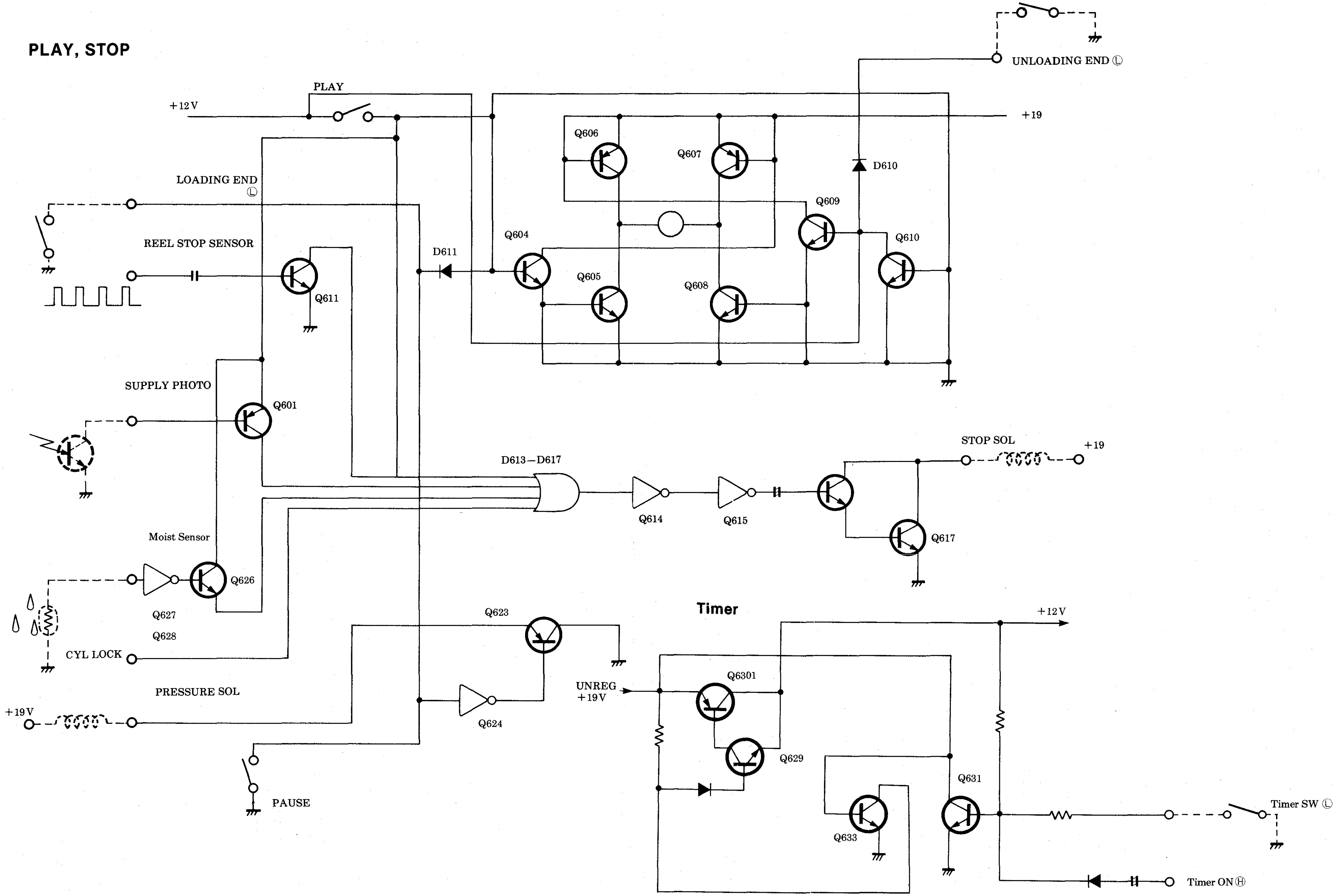

P642 (7)
PAUSE RELEASE
+12V
P642 (9)
PAUSE REC Ⓛ
+12V
P641 (10)
C. MOTOR
TP6401
D6407
Q6410, 6411
TIMER
Q6409
Q6403
D6303
Q6404
D6406
D6404
P642(6)
REEL STOP (H)
D6402
Q6405
Q6406
Q6407
P642(5)
PAUSE MUTING
P642(3)
PAUSE (L)
D6401
P642 (2)
PAUSE MUTING Ⓗ
D6409
P641(7)
SLOW DC OUT
Q6408
TP6402
D6410
D6411
D6426
D6424
P643 (2)
PLAY PAUSE +12V
P643(4)
FRAME SHOT PULSE
SLOW PULSE
R6451
P641 (2)
PG IN
IC6401, IC6404
1/4 COUNTDOWN
IC6403
③ M.M ②
D6420
Q6416
D6422
+12V
IC6402
③ M.M ⑬
D6413
Q6412
D6421
+12V
C6406, R6436
DIFF
Q6413
V. PULSE 1
R6438
P641 (3)
V. SYNC OUT
+12V
P641 (4)
D.O.C. PULSE
Q6417
Q6418
IC6402
⑪ M.M ①
D6415
V. PULSE 2
R6439
+12V
R6448, D6417
C6413, R6447
DIFF
Q6415
IC6403
⑪ GATE ⑬ ⑩
TP6403
D6418
+12V
C6411, 6412, R6445
DIFF
Q6414
TP6404
P641 (1)
D.O.C. PULSE

TRANSPORT BLOCK DIAGRAM


PLAY +12V
F.F. +12V
REW +12V
F.F.+12V
REW +12V
PLAY +12V
+12V
UNLOADING COMPLETION Ⓛ
D602
D601
D604
D605
+12V
+12V
+12V
UNREG 19V
Q635
D635
D609
D610
Q601
Q602
SUPPLY SIDE PHOTO TR
TAKE UP SIDE PHOTO TR
CP1
CP2
Q6302
Q6303
D607
D606
D632
D608
Q606
Q607
Q604
Q609
Q605
Q608
Q610
M
LOADING MOTOR
LOADING COMPLETION Ⓛ
D611
D612
Q612
CAPSTAN MOTOR DRIVE
PLAY +12V
UNREG 19V
+12V
D633
UNREG 18V
D616
D615
D618
Q614
Q615
STOP SOLENOID
UNLOADING COMPLETION Ⓛ
D613
Q611
PRESSURE ROLLER SOLENOID
D617
D626
Q613
D614
Q623
D625
Q616
Q617
Q621
Q622
Q625
PLAY Ⓗ
D622
D639
Q624
DURING HEAD CYLINDER IS ROTATING Ⓛ
MAGNET
S
N
N
S
IC6301
HALL IC
LAMP FOR PHOTO TR'S
MOIST DETECTION LAMP
UNREG 18V
Q630 COLLECTOR
TIMER LED
Q634
Q631
+12V
AC 18V
Q633
SCHMITT CIRCUIT
Q626—628
Q632
D630
TIMER SW
TIMER ON
MOIST DETECTOR
POWER SUPPLY CIRCUIT

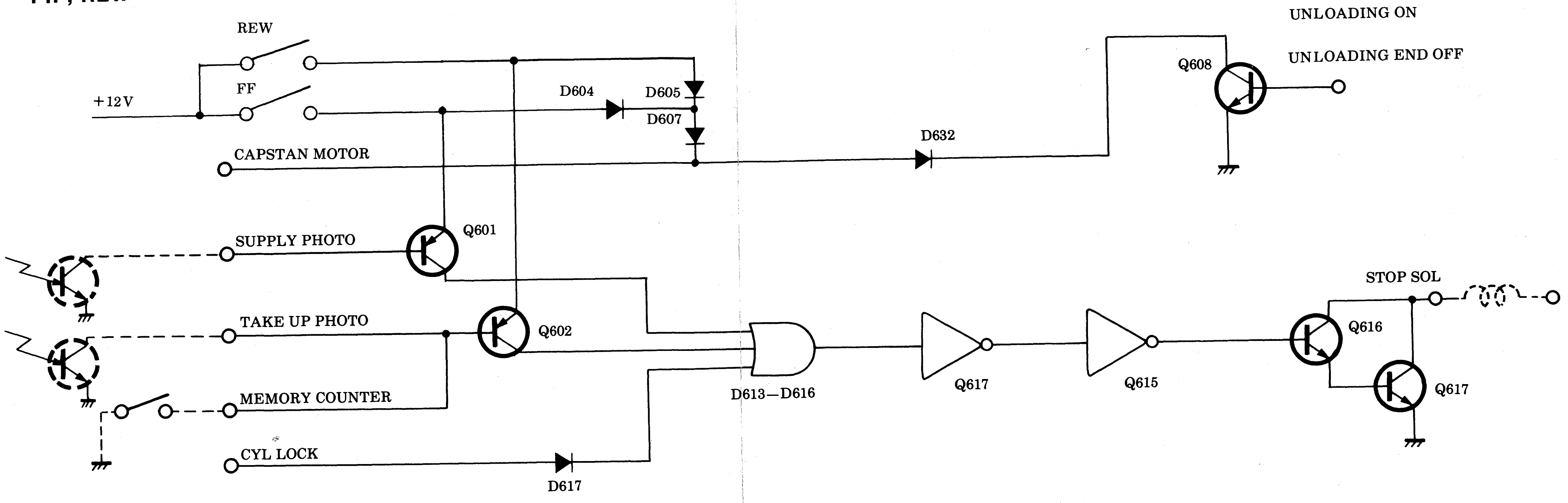
TRANSPORT BLOCK DIAGRAM

PLAY, STOP

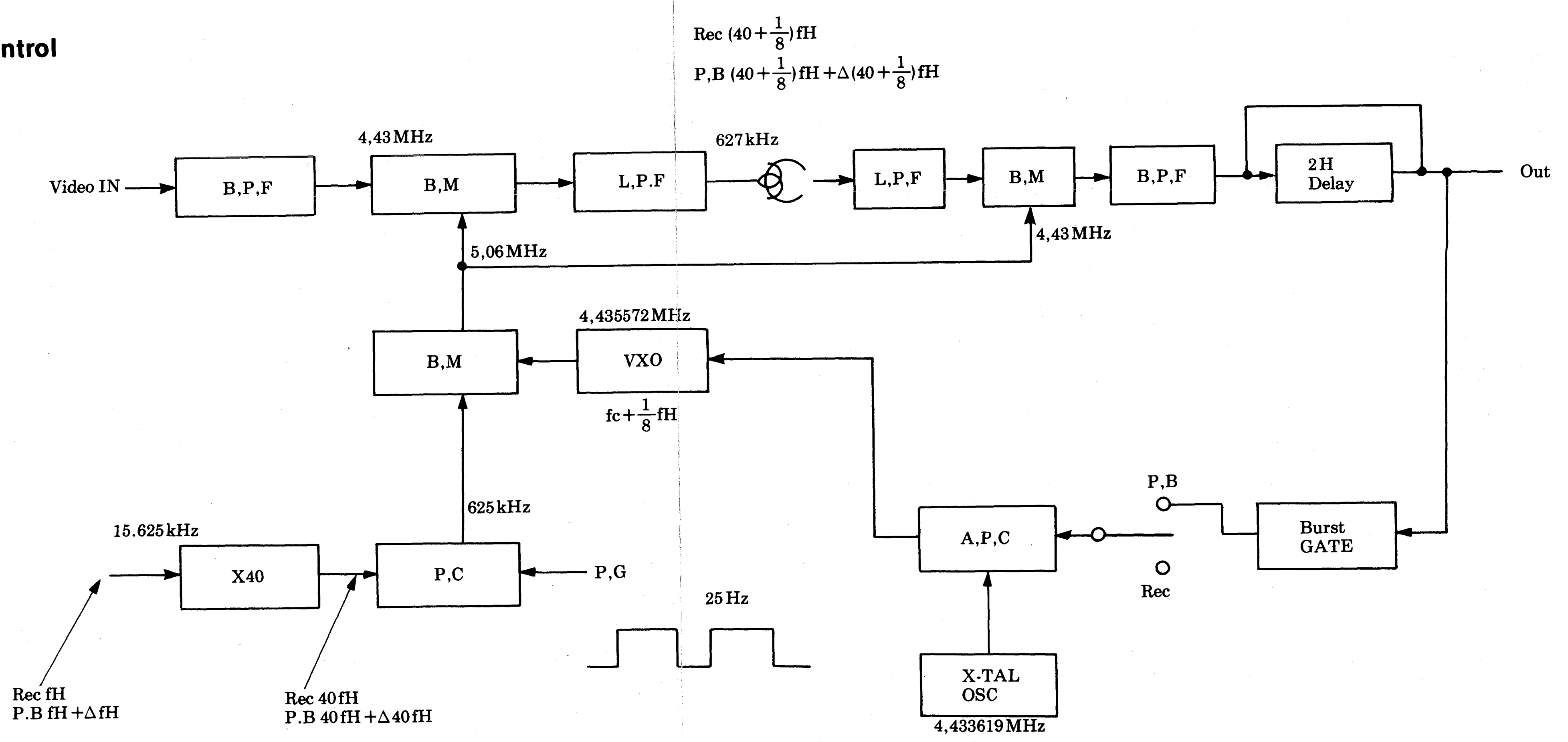

UNLOADING END Ⓛ
PLAY
+12V
+19
Q606
Q607
D610
LOADING END Ⓛ
Q609
Q604
Q610
REEL STOP SENSOR
D611
Q605
Q608
Q611
SUPPLY PHOTO
Q601
STOP SOL
+19
D613—D617
Q614
Q615
Q617
Moist Sensor
Q626
Timer
Q623
+12V
Q627
Q628
CYL LOCK
UNREG
+19V
Q6301
PRESSURE SOL
+19V
Q624
Q629
Q631
Timer SW Ⓛ
Q633
PAUSE
Timer ON Ⓗ

TRANSPORT BLOCK DIAGRAM

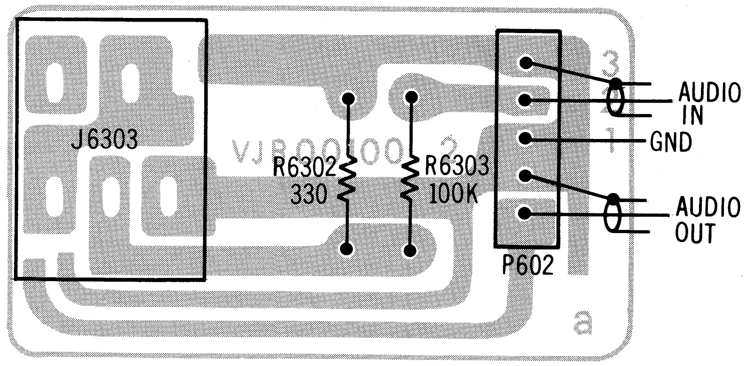
F.F, REW


REW
FF
+12V
D604
D605
D607
CAPSTAN MOTOR
D632
Q608
UNLOADING ON
UNLOADING END OFF
SUPPLY PHOTO
Q601
TAKE UP PHOTO
Q602
MEMORY COUNTER
CYL LOCK
D617
D613—D616
Q617
Q615
STOP SOL
Q616
Q617

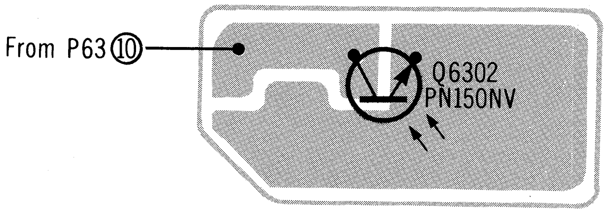
Frequency Control


Rec $(40+\frac{1}{8})$fH
P,B $(40+\frac{1}{8})$fH $+\Delta(40+\frac{1}{8})$fH
Video IN
B,P,F
4,43MHz
B,M
L,P,F
627kHz
L,P,F
B,M
B,P,F
2H Delay
Out
5,06MHz
4,43MHz
4,435572MHz
B,M
VXO
fc$+\frac{1}{8}$fH
625kHz
15.625kHz
X40
P,C
P,G
25Hz
A,P,C
P,B
Rec
Burst GATE
X-TAL OSC
4,433619MHz
Rec fH
P.B fH$+\Delta$fH
Rec 40fH
P.B 40fH$+\Delta$40fH

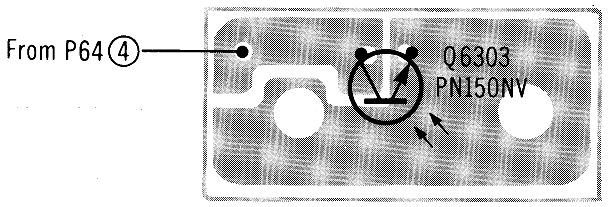
MIC JACK CIRCUIT BOARD (VJB00100)


J6303
R6302
330
R6303
100K
P602
AUDIO IN
GND
AUDIO OUT
3
2
1
a

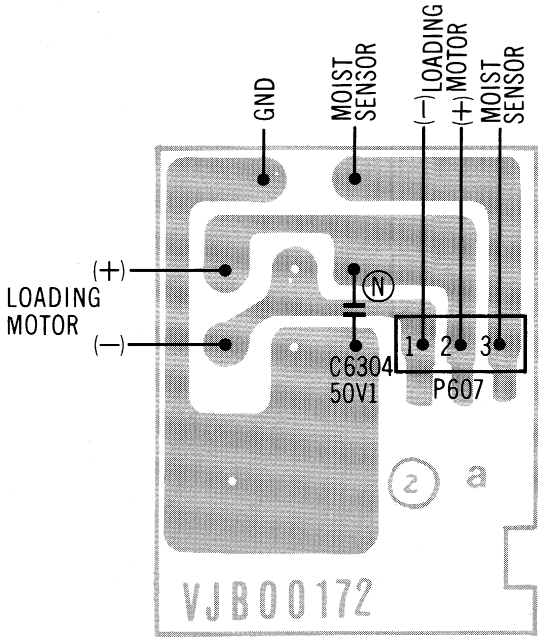
SUPPLY PHOTO TR CONNECTION (VJB00132)


From P63⑩
Q6302
PN150NV

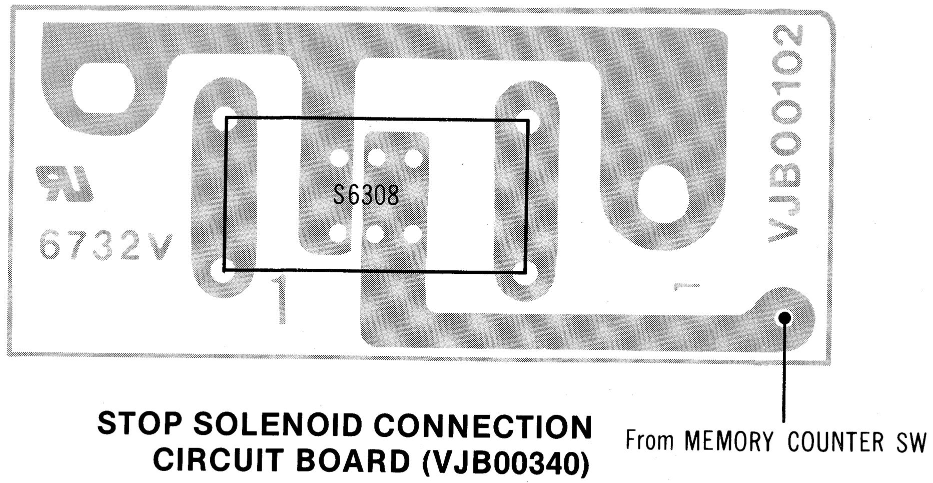
TAKEUP PHOTO TR CONNECTION CIRCUIT BOARD (VJB00183)


From P64④
Q6303
PN150NV

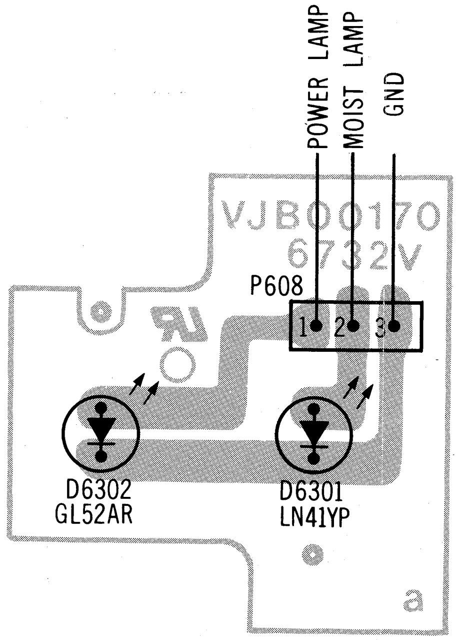
LOADING MOTOR CONNECTION CIRCUIT BOARD (VJB00172)


GND
MOIST SENSOR
(−) LOADING MOTOR
(+) LOADING MOTOR
MOIST SENSOR
LOADING MOTOR
(+)
(−)
Ⓝ
C6304
50V1
1
2
3
P607
②
a
VJB00172

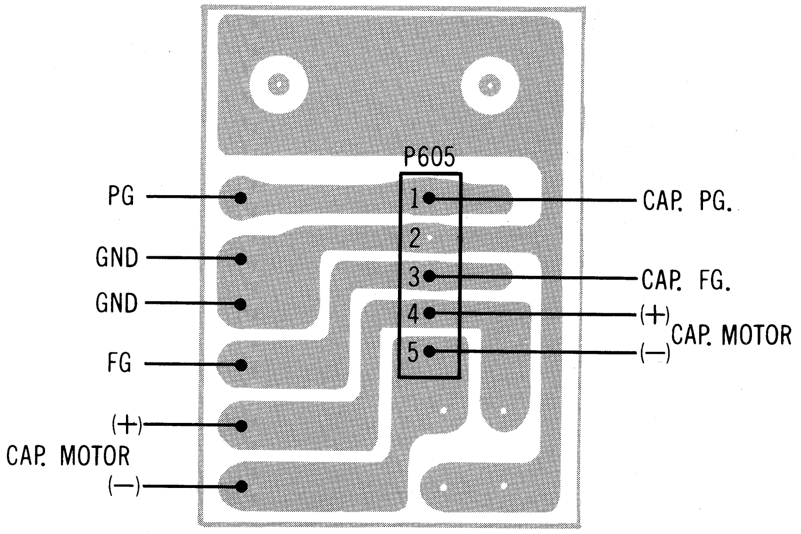
MEMORY SWITCH CONNECTION CIRCUIT BOARD (VJB00102)


S6308
6732V
VJB00102
1
From MEMORY COUNTER SW

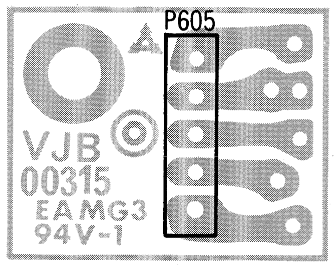
L.E.D. CIRCUIT BOARD (VJB00170)


POWER LAMP
MOIST LAMP
GND
VJB00170
6732V
P608
1
2
3
D6302
GL52AR
D6301
LN41YP
a

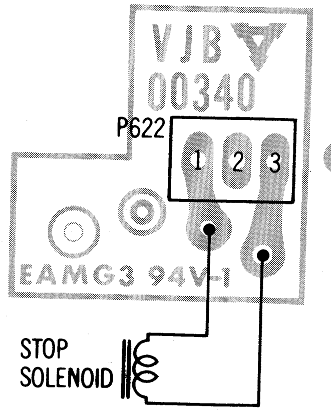
CAPSTAN MOTOR CONNECTION CIRCUIT BOARD (VJB00171)


PG
GND
GND
FG
(+)
CAP. MOTOR
(−)
P605
1
2
3
4
5
CAP. PG.
CAP. FG.
(+)
CAP. MOTOR
(−)

A/C HEAD CONNECTION CIRCUIT BOARD (VJB00315)


P605
VJB
00315
EAMG3
94V-1

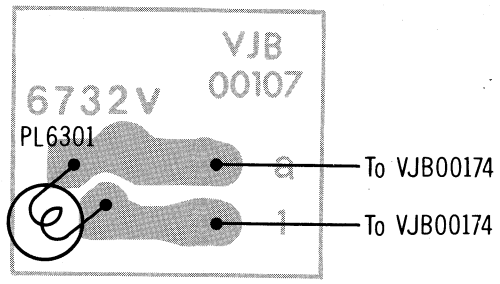
STOP SOLENOID CONNECTION CIRCUIT BOARD (VJB00340)


VJB
00340
P622
1
2
3
EAMG3 94V-1
STOP SOLENOID

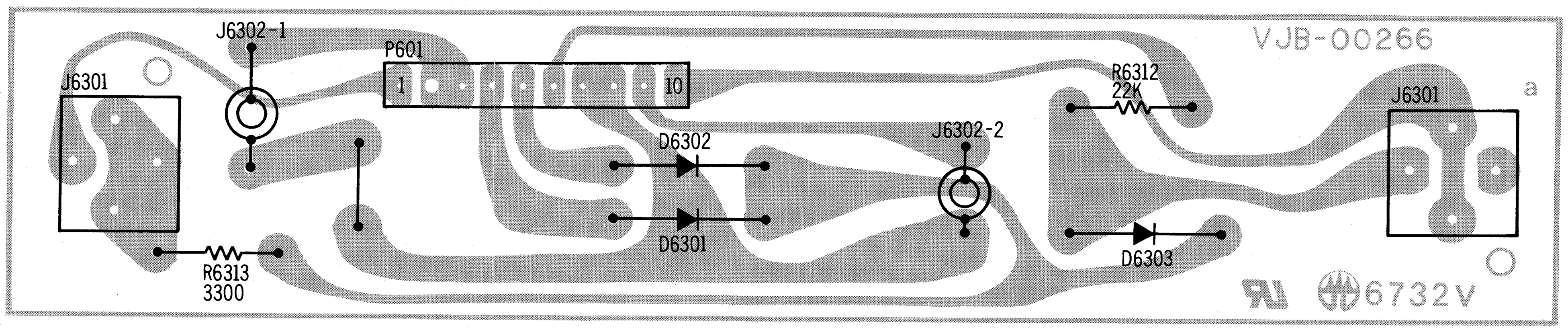
P622

1	STOP SOLENOID (+)
2	
3	STOP SOLENOID (−)

LAMP CONNECTION CIRCUIT BOARD (VJB00107)


VJB
00107
6732V
PL6301
a
1
To VJB00174
To VJB00174

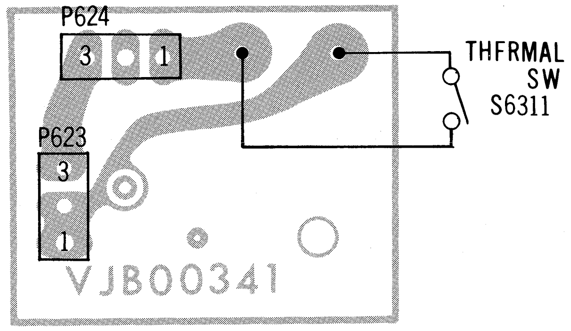
REAR JACK CONNECTION CIRCUIT BOARD (VJB00266)


J6301
J6302-1
P601
1
10
D6302
D6301
R6313
3300
J6302-2
R6312
22K
D6303
J6301
VJB-00266
a
6732V

THERMAL SW CIRCUIT BOARD (VJB00341)

P 624

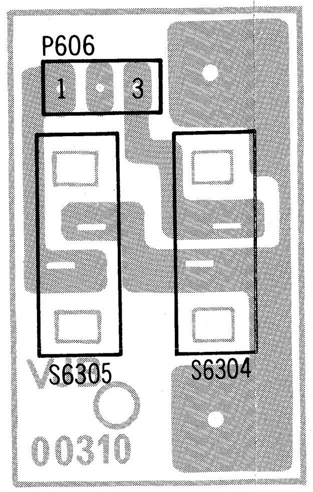
1	PTC
2	
3	PTC


P624
3
1
P623
3
1
THFRMAL
SW
S6311
VJB00341

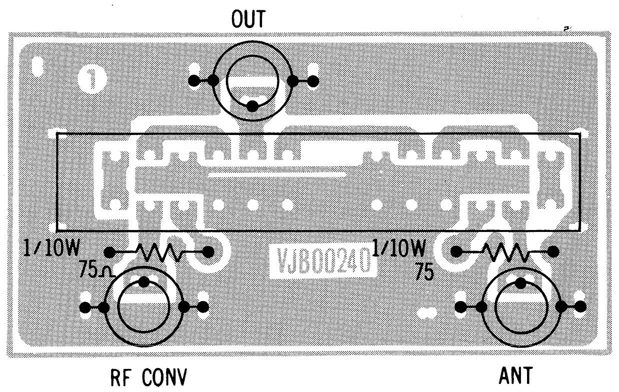
P 623

3	PTC
2	
1	TH. SW

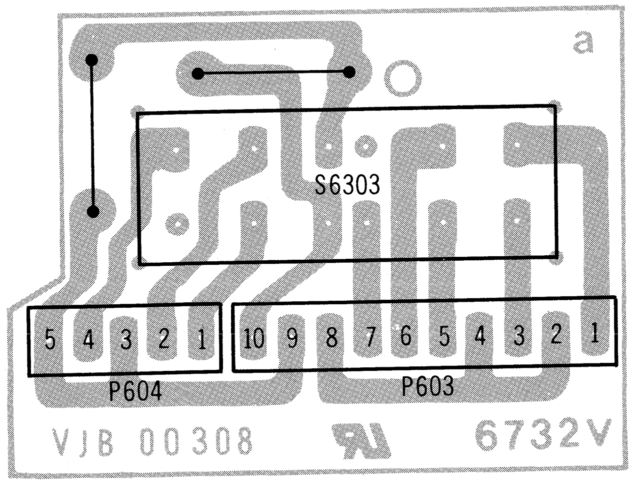
LOADING/UNLOADING COMPLETION SWITCHES CIRCUIT BOARD (VJB00310)


P606
1
3
S6305
S6304
00310

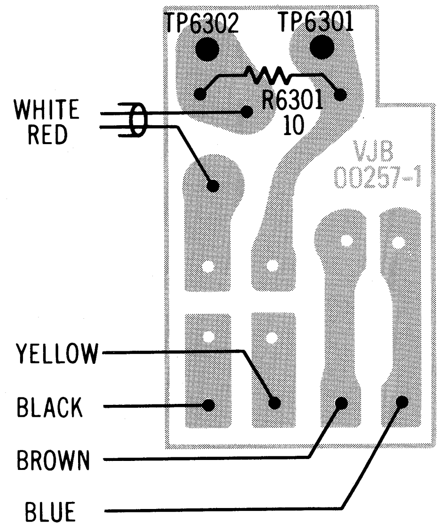
ANTENNA SELECTOR CIRCUIT BOARD (VJB00240)


OUT
1
1/10W
75Ω
VJB00240
1/10W
75
RF CONV
ANT

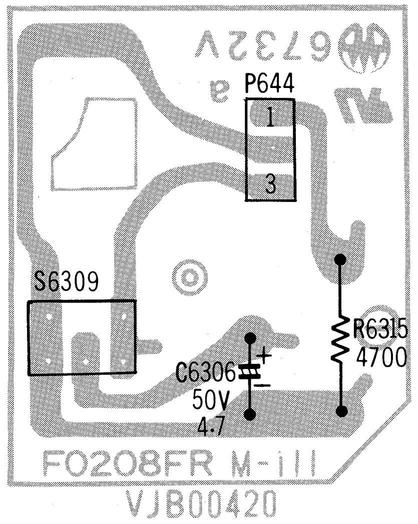
INPUT SELECTOR CIRCUIT BOARD (VJB00308)


a
S6303
5 4 3 2 1
10 9 8 7 6 5 4 3 2 1
P604
P603
VJB 00308
6732V

AUDIO/CONTROL HEAD CIRCUIT BOARD (VJB00275)


TP6302
TP6301
R6301
10
WHITE
RED
VJB
00257-1
YELLOW
BLACK
BROWN
BLUE

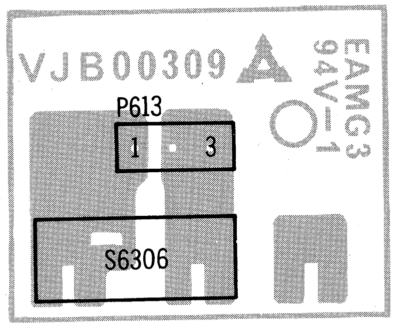
SUB STILL CIRCUIT BOARD (VJB00420)


6732V
P644
1
3
S6309
R6315
4700
C6306
50V
4.7
F0208FR M-III
VJB00420

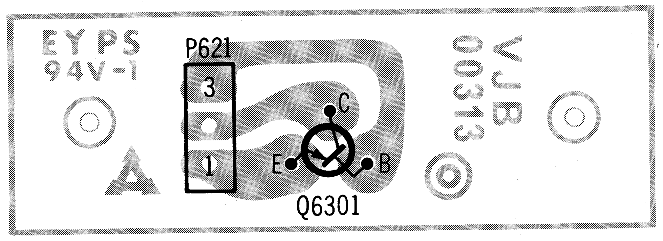
P644

1	PLAY PAUSE +12V
3	FROM SHOT PULSE

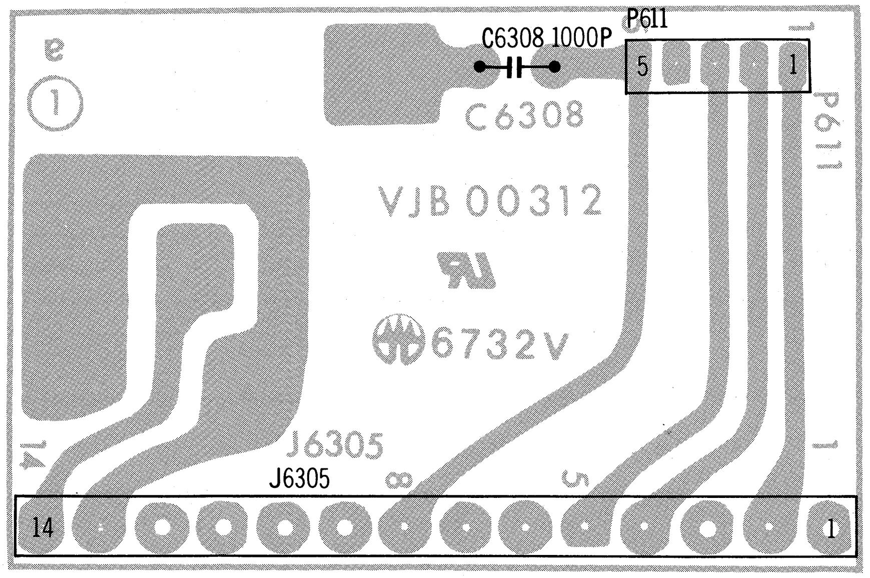
TAPE SLACK SWITCH CIRCUIT BOARD (VJB00309)


VJB00309
EAMG3
94V-1
P613
1
3
S6306

POWER TRANSISTOR CIRCUIT BOARD (VJB00313)


EY PS
94V-1
P621
3
1
C
E
B
Q6301
VJB
00313

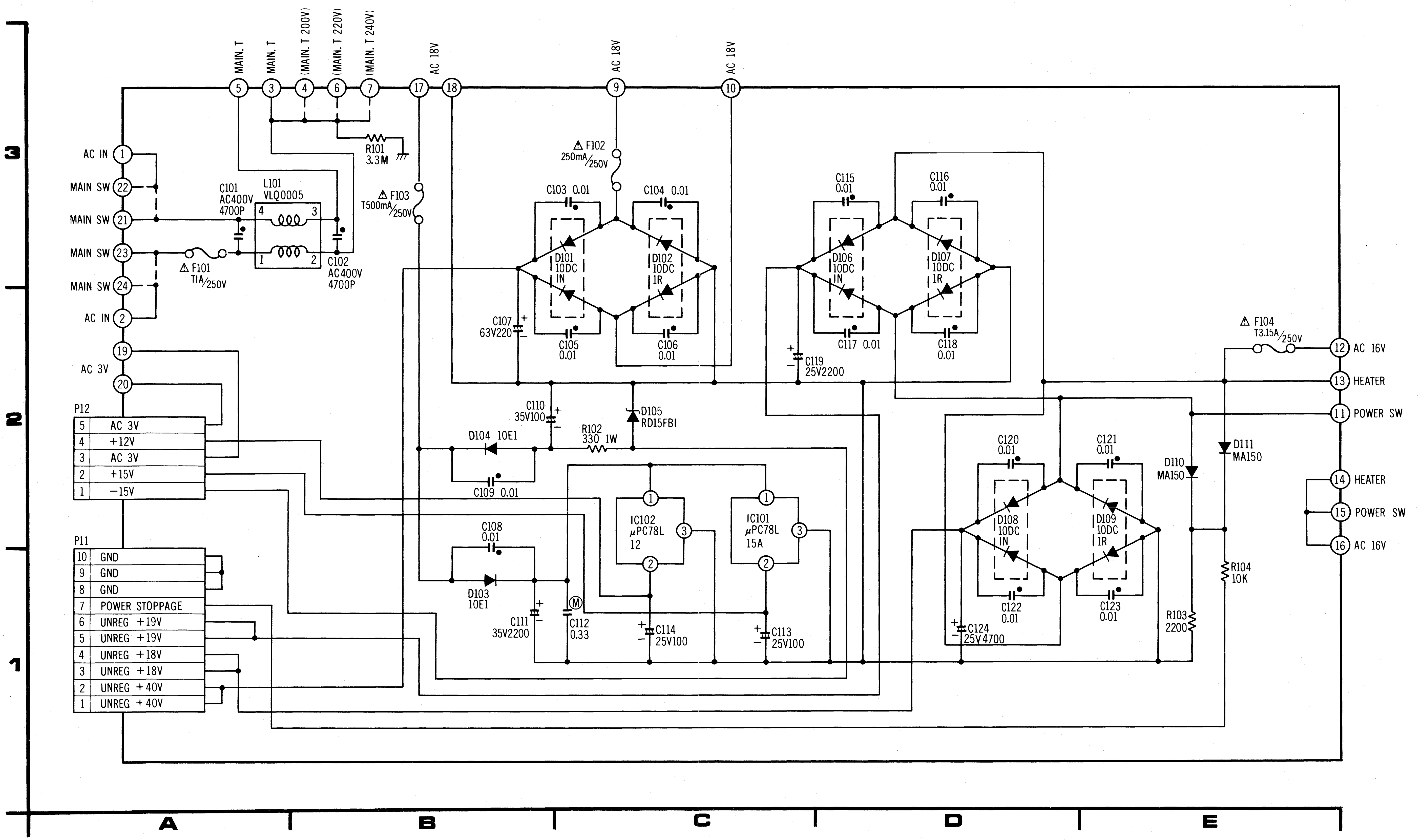
RF CONVERTER CONNECTION CIRCUIT BOARD (VJB00312)


C6308 1000P
P611
5
1
C6308
VJB 00312
6732V
J6305
J6305
14
8
5
1
14
1

P611

1	AUDIO IN
2	GND
3	VIDEO IN
4	
5	+9V

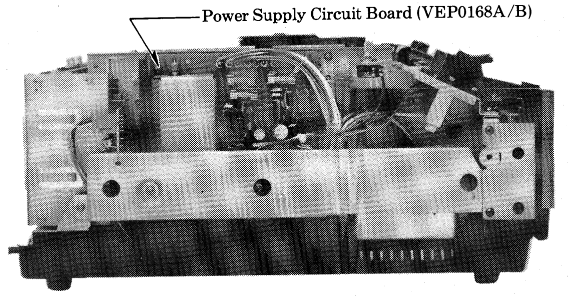
POWER SUPPLY SCHEMATIC DIAGRAM (VEP0168A/VEP0168B)

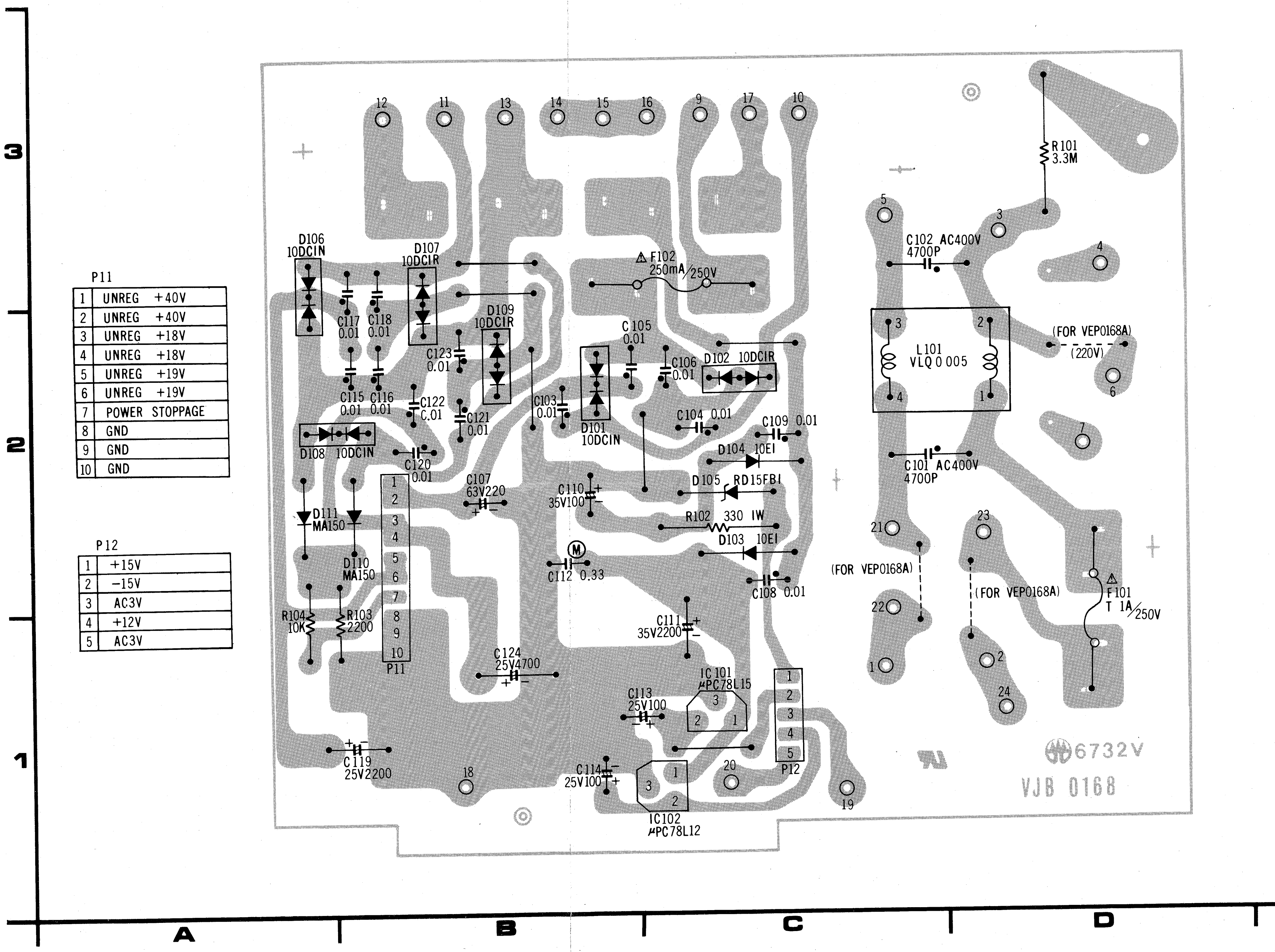

MAIN. T
MAIN. T
(MAIN. T 200V)
(MAIN. T 220V)
(MAIN. T 240V)
AC 18V
AC 18V
AC 18V
5
3
4
6
7
17
18
9
10
AC IN 1
MAIN SW 22
MAIN SW 21
MAIN SW 23
MAIN SW 24
AC IN 2
19
AC 3V
20
R101
3.3M
C101
AC400V
4700P
L101
VLQ0005
C102
AC400V
4700P
⚠F101
T1A/250V
⚠F103
T500mA/250V
⚠F102
250mA/250V
C103 0.01
C104 0.01
D101
10DC
IN
D102
10DC
1R
C105
0.01
C106
0.01
C107
63V220
C115
0.01
C116
0.01
D106
10DC
IN
D107
10DC
1R
C117 0.01
C118
0.01
C119
25V2200
C110
35V100
D105
RD15FB1
R102
330 1W
D104 10E1
C109 0.01
C108
0.01
D103
10E1
C111
35V2200
C112
0.33
IC102
μPC78L
12
IC101
μPC78L
15A
C114
25V100
C113
25V100
C120
0.01
C121
0.01
D108
10DC
IN
D109
10DC
1R
C122
0.01
C123
0.01
C124
25V4700
D110
MA150
D111
MA150
R104
10K
R103
2200
⚠F104
T3.15A/250V
12 AC 16V
13 HEATER
11 POWER SW
14 HEATER
15 POWER SW
16 AC 16V
P12
5 AC 3V
4 +12V
3 AC 3V
2 +15V
1 −15V
P11
10 GND
9 GND
8 GND
7 POWER STOPPAGE
6 UNREG +19V
5 UNREG +19V
4 UNREG +18V
3 UNREG +18V
2 UNREG +40V
1 UNREG +40V
3
2
1
A
B
C
D
E

POWER SUPPLY CIRCUIT BOARD (VEP0168A/VEP0168B)

P11 (Power Supply)		
PIN NO.	SIGNAL NAME	DESTINATION
1	Unreg +40V	—
2	Unreg +40V	P704-2 (TV Demodulator)
3	Unreg +18V	P62-8 (Reg. & Transport)
4	Unreg +18V	P622-3 (Stop Sol.)
5	Unreg +19V	(Pressure Roller Sol)
6	Unreg +19V	P62-3 (Transport Circuit)
7	Power Stop Page	P62-7 (Transport Circuit)
8	Gnd	P614-2 (Reel Sensor)
9	Gnd	P62-5 (Transport Circuit)
10	Gnd	P6201-4 (Timer)

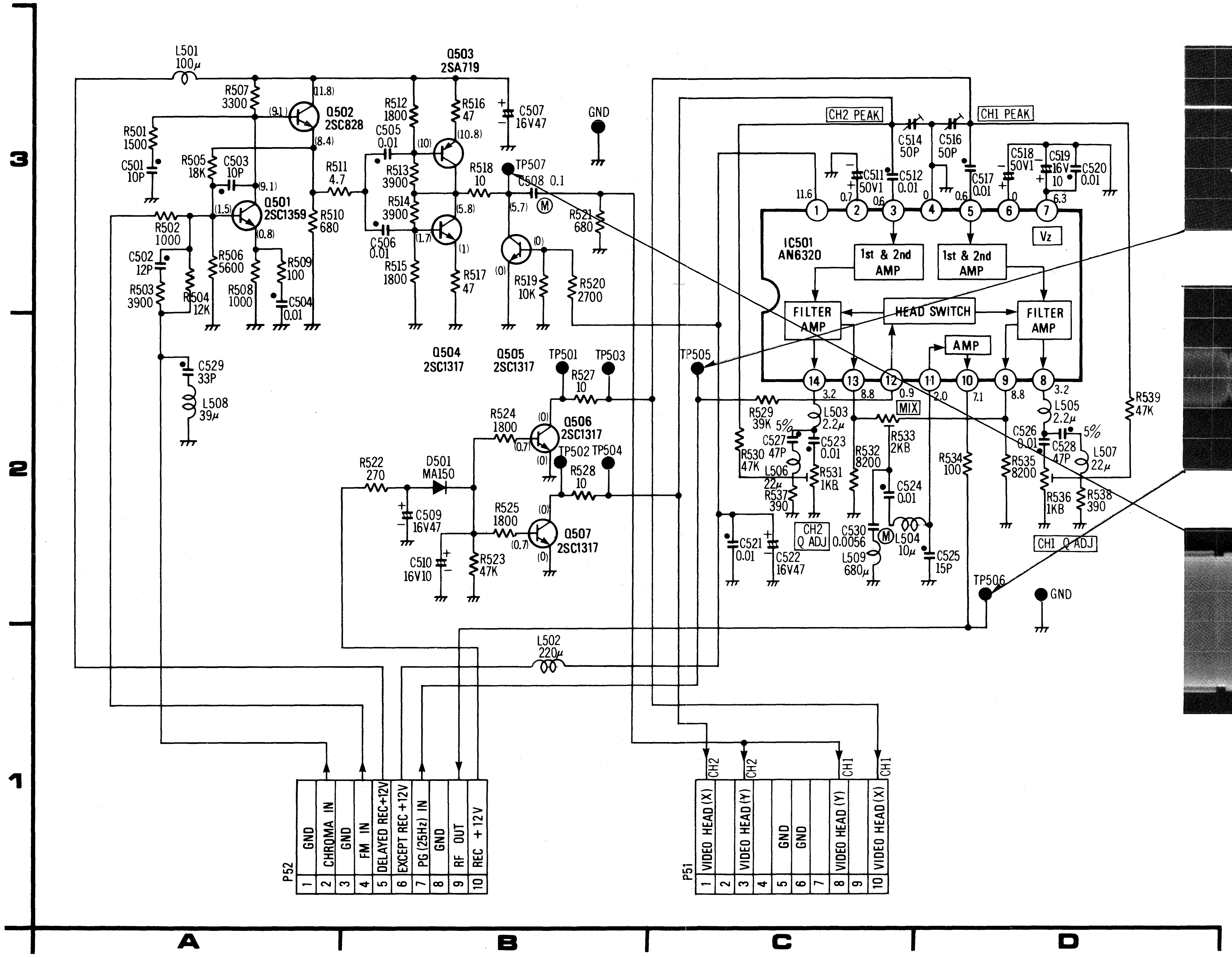
P12 (Power Supply)		
PIN NO.	SIGNAL NAME	DESTINATION
1	−15V	P6201-6 (Timer)
2	+15V	P6201-7 (Timer)
3	+3V AC	P6201-3 (Timer)
4	+12V Booster	P703-1 (TV Demodulator)
5	+3V AC	P6201-3 (Timer)

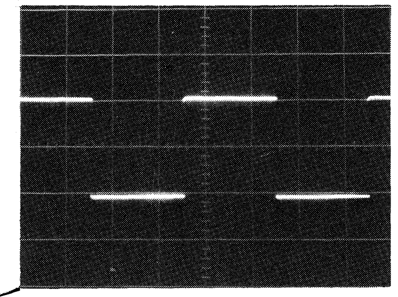

Power Supply Circuit Board (VEP0168A/B)


3
2
1
A
B
C
D
E
P11
1 UNREG +40V
2 UNREG +40V
3 UNREG +18V
4 UNREG +18V
5 UNREG +19V
6 UNREG +19V
7 POWER STOPPAGE
8 GND
9 GND
10 GND
P12
1 +15V
2 −15V
3 AC3V
4 +12V
5 AC3V
12
11
13
14
15
16
9
17
10
D106 10DCIN
D107 10DCIR
C117 0.01
C118 0.01
C115 0.01
C116 0.01
D108 10DCIN
D109 10DCIR
C123 0.01
C122 C.01
C121 0.01
C120 0.01
D111 MA150
D110 MA150
R104 10K
R103 2200
C107 63V220
C124 25V4700
C119 25V2200
18
⚠F102 250mA/250V
C105 0.01
C106 0.01
D102 10DCIR
C103 0.01
D101 10DCIN
C104 0.01
C109 0.01
D104 10EI
D105 RD15FBI
C110 35V100
R102 330 1W
D103 10EI
C112 0.33
C108 0.01
C111 35V2200
IC101 μPC78L15
C113 25V100
C114 25V100
IC102 μPC78L12
20
P12
19
R101 3.3M
5
3
4
C102 AC400V 4700P
L101 VLQ0005
(FOR VEP0168A)
(220V)
6
7
C101 AC400V 4700P
21
22
1
23
(FOR VEP0168A)
(FOR VEP0168A)
2
24
⚠F101 T 1A/250V
6732V
VJB 0168

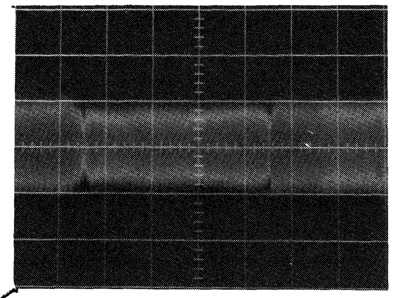
① AC IN
② AC IN
③ MAIN TRANS
④ MAIN TRANS 200V
⑤ MAIN TRANS
⑥ MAIN TRANS 220V
⑦ MAIN TRANS 240V
⑧
⑨ AC 18V
⑩ AC 18V
⑪ POWER SW
⑫ AC 16V
⑬ HEATER
⑭ HEATER
⑮ POWER SW
⑯ AC 16V
⑰ AC 18V
⑱ AC 18V
⑲ AC 3V
⑳ AC 3V
㉑ MAIN SW
㉒ MAIN SW
㉓ MAIN SW
㉔ MAIN SW

REC & HEAD AMP SCHEMATIC DIAGRAM

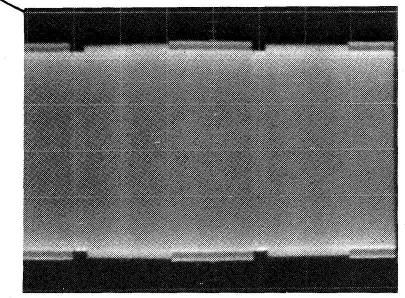

L501 100μ
R507 3300
Q502 2SC828
R501 1500
C501 10P
R505 18K
C503 10P
Q501 2SC1359
R510 680
R511 4.7
R502 1000
C502 12P
R503 3900
R504 12K
R506 5600
R508 1000
R509 100
C504 0.01
C529 33P
L508 39μ
Q503 2SA719
R512 1800
C505 0.01
R516 47
C507 16V47
R513 3900
R514 3900
C506 0.01
R515 1800
R517 47
R518 10
TP507
C508 0.1
R521 680
R519 10K
R520 2700
GND
Q504 2SC1317
Q505 2SC1317
TP501
TP503
R527 10
R524 1800
Q506 2SC1317
TP502
TP504
R528 10
R522 270
D501 MA150
C509 16V47
R525 1800
Q507 2SC1317
C510 16V10
R523 47K
L502 220μ
CH2 PEAK
CH1 PEAK
C514 50P
C516 50P
C511 50V1
C512 0.01
C517 0.01
C518 50V1
C519 16V 10
C520 0.01
IC501 AN6320
1st & 2nd AMP
1st & 2nd AMP
Vz
FILTER AMP
HEAD SWITCH
FILTER AMP
AMP
MIX
TP505
R529 39K 5%
L503 2.2μ
R530 47K
C527 47P
C523 0.01
L506 22μ
R537 390
R531 1KB
R532 8200
R533 2KB
C524 0.01
CH2 Q ADJ
C521 0.01
C522 16V47
C530 0.0056
L509 680μ
L504 10μ
C525 15P
R534 100
L505 2.2μ
C526 0.01
C528 47P 5%
L507 22μ
R535 8200
R536 1KB
R538 390
R539 47K
CH1 Q ADJ
TP506
GND
P52
1 GND
2 CHROMA IN
3 GND
4 FM IN
5 DELAYED REC+12V
6 EXCEPT REC +12V
7 PG (25Hz) IN
8 GND
9 RF OUT
10 REC +12V
P51
1 VIDEO HEAD (X)
2
3 VIDEO HEAD (Y)
4
5 GND
6 GND
7
8 VIDEO HEAD (Y)
9
10 VIDEO HEAD (X)
CH2
CH2
CH1
CH1
1
2
3
A
B
C
D



TP505
5V/10msec. div.



TP506 P.B. Mode
0.2V/5msec. div.



TP507 Rec Mode
1V/5msec. div.

REC & HEAD AMP CIRCUIT BOARD (VEP0536B)

P51 (Rec & Head Amp)

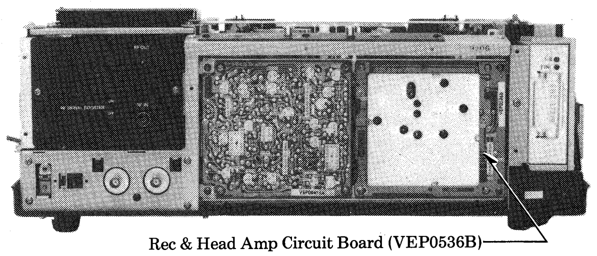
PIN NO.	SIGNAL NAME	DESTINATION
1	Video Head (X)	—
2	—	—
3	Video Head (Y)	—
4	—	—
5	Gnd	—
6	Gnd	—
7	—	—
8	Video Head (Y)	—
9	—	—
10	Video Head (X)	—

P52 (Rec & Head Amp)

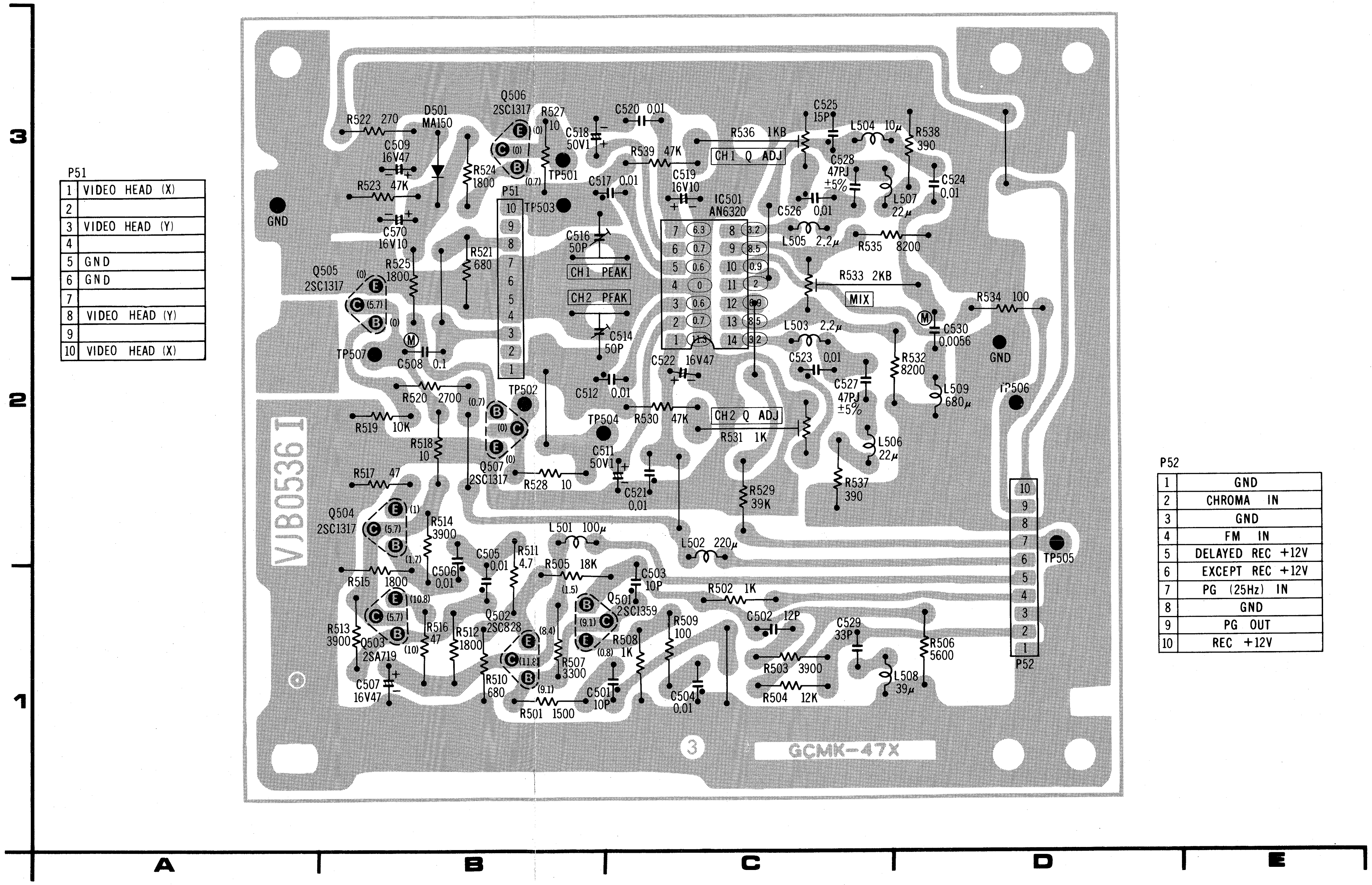
PIN NO.	SIGNAL NAME	DESTINATION
1	Gnd	P34-4 (Luminance Process)
2	Chroma In	P34-5 (Luminance Process)
3	Gnd	P35-1 (Luminance Process)
4	Fm In	P35-2 (Luminance Process)
5	Delayed Rec +12V	P34-2 (Luminance Process)
6	Except Rec +12V	P35-3 (Luminance Process)
7	PG (25 Hz) In	P34-3 (Luminance Process)
8	Gnd	P35-5 (Luminance Process)
9	Rf Out	P35-4 (Luminance Process)
10	Rec +12V	P34-1 (Luminance Process)

Rec & Head Amp.

Q501	B-1
Q502	B-1
Q503	B-1
Q504	B-2
Q505	B-2
Q506	B-3
Q507	B-2

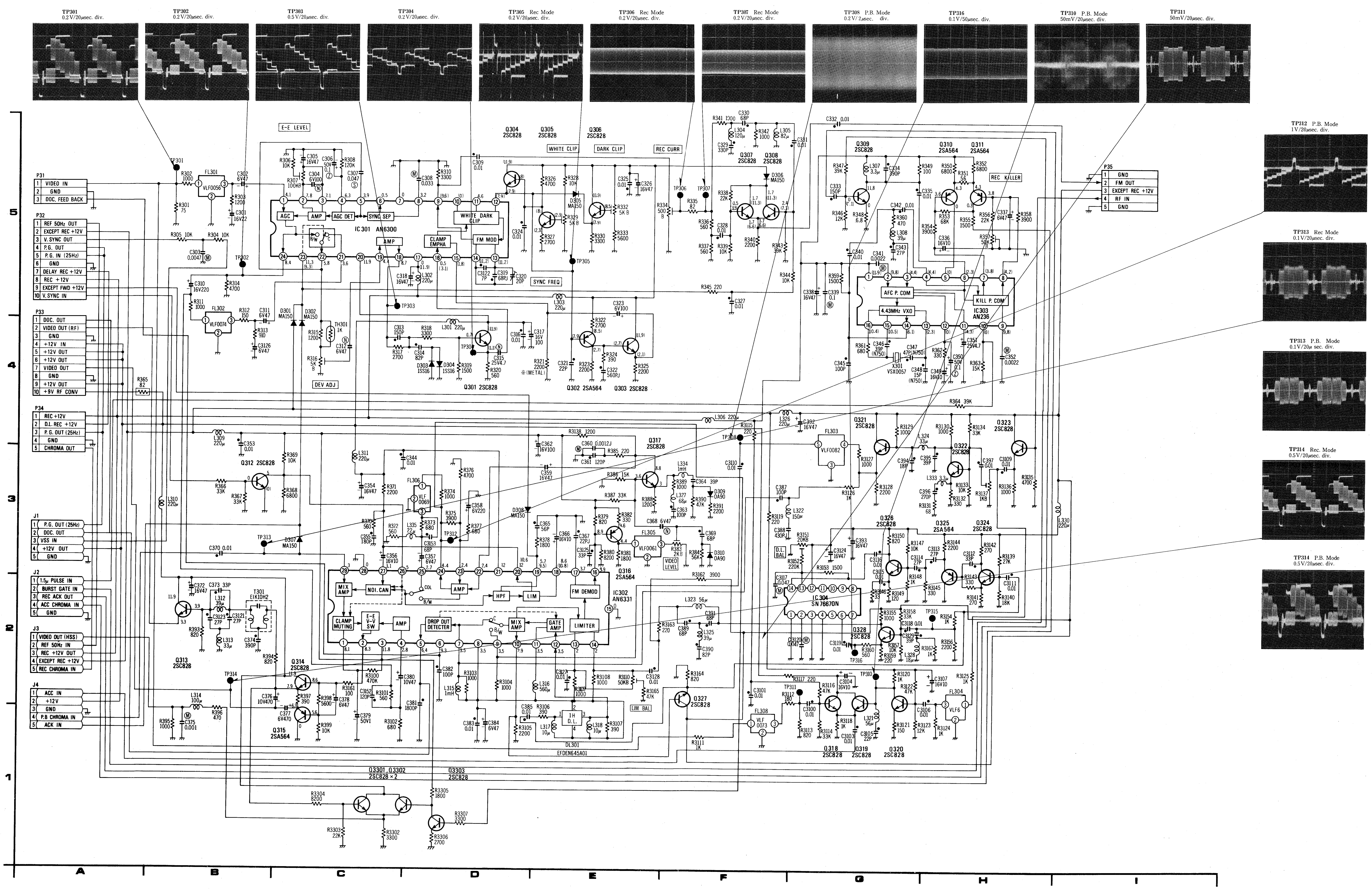


Rec & Head Amp Circuit Board (VEP0536B)



P51
1 VIDEO HEAD (X)
2
3 VIDEO HEAD (Y)
4
5 GND
6 GND
7
8 VIDEO HEAD (Y)
9
10 VIDEO HEAD (X)
P52
1 GND
2 CHROMA IN
3 GND
4 FM IN
5 DELAYED REC +12V
6 EXCEPT REC +12V
7 PG (25Hz) IN
8 GND
9 PG OUT
10 REC +12V
3
2
1
A
B
C
D
E
GND
TP507
TP501
TP502
TP503
TP504
TP505
TP506
IC501 AN6320
D501 MA150
Q501 2SC1359
Q502 2SC828
Q503 2SA719
Q504 2SC1317
Q505 2SC1317
Q506 2SC1317
Q507 2SC1317
CH1 Q ADJ
CH2 Q ADJ
CH1 PEAK
CH2 PEAK
MIX
R522 270
C509 16V47
R523 47K
C570 16V10
R524 1800
R521 680
R525 1800
C508 0.1
R527 10
C518 50V1
C520 0.01
R539 47K
C519 16V10
C517 0.01
C516 50P
C514 50P
C512 0.01
C522 16V47
R536 1KB
C525 15P
L504 10μ
R538 390
C528 47PJ ±5%
C524 0.01
C526 0.01
L507 22μ
L505 2.2μ
R535 8200
R533 2KB
R534 100
C530 0.0056
L503 2.2μ
C523 0.01
R532 8200
C527 47PJ ±5%
L509 680μ
L506 22μ
R537 390
R529 39K
R531 1K
R530 47K
R520 2700
R519 10K
R518 10
R517 47
R528 10
C511 50V1
C521 0.01
R514 3900
L501 100μ
L502 220μ
C505 0.01
R511 4.7
R505 18K
C503 10P
C506 0.01
R515 1800
R513 3900
R516 47
R512 1800
R510 680
R507 3300
R508 1K
R509 100
R502 1K
C502 12P
C529 33P
R506 5600
R503 3900
R504 12K
L508 39μ
C504 0.01
C501 10P
R501 1500
C507 16V47
VJB0536 I
GCMK-47X

LUMINANCE PROCESS SCHEMATIC DIAGRAM


TP301 0.2V/20μsec. div.
TP302 0.2V/20μsec. div.
TP303 0.5V/20μsec. div.
TP304 0.2V/20μsec. div.
TP305 Rec Mode 0.2V/20μsec. div.
TP306 Rec Mode 0.2V/20μsec. div.
TP307 Rec Mode 0.2V/20μsec. div.
TP308 P.B. Mode 0.2V/2μsec. div.
TP316 0.1V/50μsec. div.
TP310 P.B. Mode 50mV/20μsec. div.
TP311 50mV/20μsec. div.
TP312 P.B. Mode 1V/20μsec. div.
TP313 Rec Mode 0.1V/20μsec. div.
TP313 P.B. Mode 0.1V/20μ sec. div.
TP314 Rec. Mode 0.5V/20μsec. div.
TP314 P.B. Mode 0.5V/20μsec. div.
P31
1 VIDEO IN
2 GND
3 DOC. FEED BACK
P32
1 REF 50Hz OUT
2 EXCEPT REC +12V
3 V. SYNC OUT
4 P.G. OUT
5 P.G. IN (25Hz)
6 GND
7 DELAY REC +12V
8 REC +12V
9 EXCEPT FWD +12V
10 V. SYNC IN
P33
1 DOC. OUT
2 VIDEO OUT (RF)
3 GND
4 +12V IN
5 +12V OUT
6 +12V OUT
7 VIDEO OUT
8 GND
9 +12V OUT
10 +9V RF CONV
P34
1 REC +12V
2 D.L. REC +12V
3 P.G. OUT (25Hz)
4 GND
5 CHROMA OUT
J1
1 P.G. OUT (25Hz)
2 DOC. OUT
3 VSS IN
4 +12V OUT
5 GND
J2
1 1.5μ PULSE IN
2 BURST GATE IN
3 REC ACK OUT
4 ACC CHROMA IN
5 GND
J3
1 VIDEO OUT (HSS)
2 REF 50Hz IN
3 REC +12V OUT
4 EXCEPT REC +12V
5 REC CHROMA IN
J4
1 ACC IN
2 +12V
3 GND
4 P.B CHROMA IN
5 ACK IN
P35
1 GND
2 FM OUT
3 EXCEPT REC +12V
4 RF IN
5 GND
E-E LEVEL
AGC
AMP
AGC DET
SYNC SEP
IC 301 AN6300
AMP
CLAMP EMPHA
WHITE DARK CLIP
FM MOD
SYNC FREQ
DEV ADJ
WHITE CLIP
DARK CLIP
REC CURR
REC KILLER
Q304 2SC828
Q305 2SC828
Q306 2SC828
Q307 2SC828
Q308 2SC828
Q301 2SC828
Q302 2SA564
Q303 2SC828
Q309 2SC828
Q310 2SA564
Q311 2SA564
AFC P. COM
KILL P. COM
4.43MHz VXO
IC303 AN236
X301 VSX0057
Q312 2SC828
Q313 2SC828
Q314 2SC828
Q315 2SA564
Q316 2SA564
Q317 2SC828
Q318 2SC828
Q319 2SC828
Q320 2SC828
Q321 2SC828
Q322 2SC828
Q323 2SC828
Q324 2SC828
Q325 2SA564
Q326 2SC828
Q327 2SC828
Q328 2SC828
MIX AMP
NOI. CAN
CLAMP MUTING
E-E V-V SW
AMP
DROP OUT DETECTER
MIX AMP
GATE AMP
LIMITER
HPF
LIM
FM DEMOD
IC302 AN6331
IC 304 SN76670N
VIDEO LEVEL
LIM BAL
D.L BAL
1H D.L.
DL301 EFDEN645A01
T301 EIKIOH2
FL301 VLF0056
FL302 VLF0074
FL303 VLF0082
FL304 VLF6
FL305 VLF0061
FL306 VLF0069
FL308 VLF0073
D301 MA150
D302 MA150
D303 1SS16
D304 1SS16
D305 MA150
D306 MA150
D307 MA150
D308 MA150
D309 OA90
D310 OA90
TH301 1K
※(METAL)
Q3301 Q3302 2SC828×2
Q3303 2SC828
A
B
C
D
E
F
G
H
I
1
2
3
4
5

P31 (Luminance Process)		
PIN NO.	SIGNAL NAME	DESTINATION
1	Video In	P603-5 (Input Selector)
2	Gnd	P603-4 (Input Selector)
3	DOC Feed Back	P641-4 (Still Section)

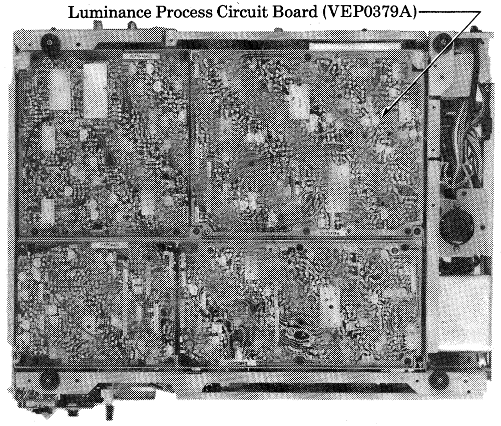
P32 (Luminance Process)		
PIN NO.	SIGNAL NAME	DESTINATION
1	Ref 50Hz Out	P22-5 (Control Section)
2	Except Rec +12V	P43-9 (Audio Section)
3	V-Sync Out	P22-3 (Control Section)
4	PG (25Hz) Out	P641-2 (Still Section)
5	P.G. In (25Hz)	P22-2 (Control Section)
6	Gnd	P21-6 (Control Section)
7	Delay Rec +12V	P21-1 (Control Section)
8	Rec +12V	P22-6 (Control Section)
9	E-E, V-V Select	P21-4 (Control Section)
10	Pause	P641 (Audio Section)

P33 (Luminance Process)		
PIN NO.	SIGNAL NAME	DESTINATION
1	DOC Out	P641-1 (Still Section)
2	Video Out	P671-4 (Test Sig. & Gene.)
3	Pause (L)	P642-5 (Still Section)
4	+12V In	P62-10 (Transport Section)
5	+12V Out	P601-6 (Rear Jack Connection)
6	+12V Out	P603-6 (Input Selector)
7	Video Out	P615-1 (Test Sig. & Gen.)
8	Gnd	P615-2 (Test Sig. & Gen.)
9	+12V Out	P704-1 (TV Demodulator)
10	+9V Rf Conv	P611-5 (RF Converter Connection)

P34 (Luminance Process)		
PIN NO.	SIGNAL NAME	DESTINATION
1	Rec +12V	P52-10 (Rec & Head Amp)
2	D.L. Rec +12V	P52-5 (Rec & Head Amp)
4	P.G. Out (25Hz)	P52-7 (Rec & Head Amp)
4	Gnd	P52-1 (Rec & Head Amp)
5	Chroma Out	P52-2 (Rec & Head Amp)

Luminance Process	
Q302	D-3
Q303	D-3
Q304	E-3
Q305	E-3
Q306	E-3
Q307	E-4
Q308	E-4
Q309	B-2
Q310	C-3
Q311	C-3
Q312	D-1
Q313	C-1
Q314	C-1
Q315	C-1
Q316	D-1
Q317	F-1
Q318	B-4
Q319	B-4
Q320	B-4
Q321	F-2
Q322	F-2
Q323	F-3
Q324	F-4
Q325	F-4
Q326	F-4
Q327	F-3
Q328	G-3
Q329	
Q330	
Q331	
Q3301	C-1
Q3302	C-2
Q3303	D-1
IC301	D-3
IC302	E-1
IC303	B-3
IC304	F-3

Luminance Process Circuit Board (VEP0379A)



LUMINANCE PROCESS CIRCUIT BOARD (VEP0379A)

JA	
1	PG OUT
2	DOC OUT
3	VSS IN
4	+12V OUT
5	GND

JB	
1	2μ PULSE IN
2	BURST GATE IN
3	REC ACK OUT
4	ACC CHROMA IN
5	GND

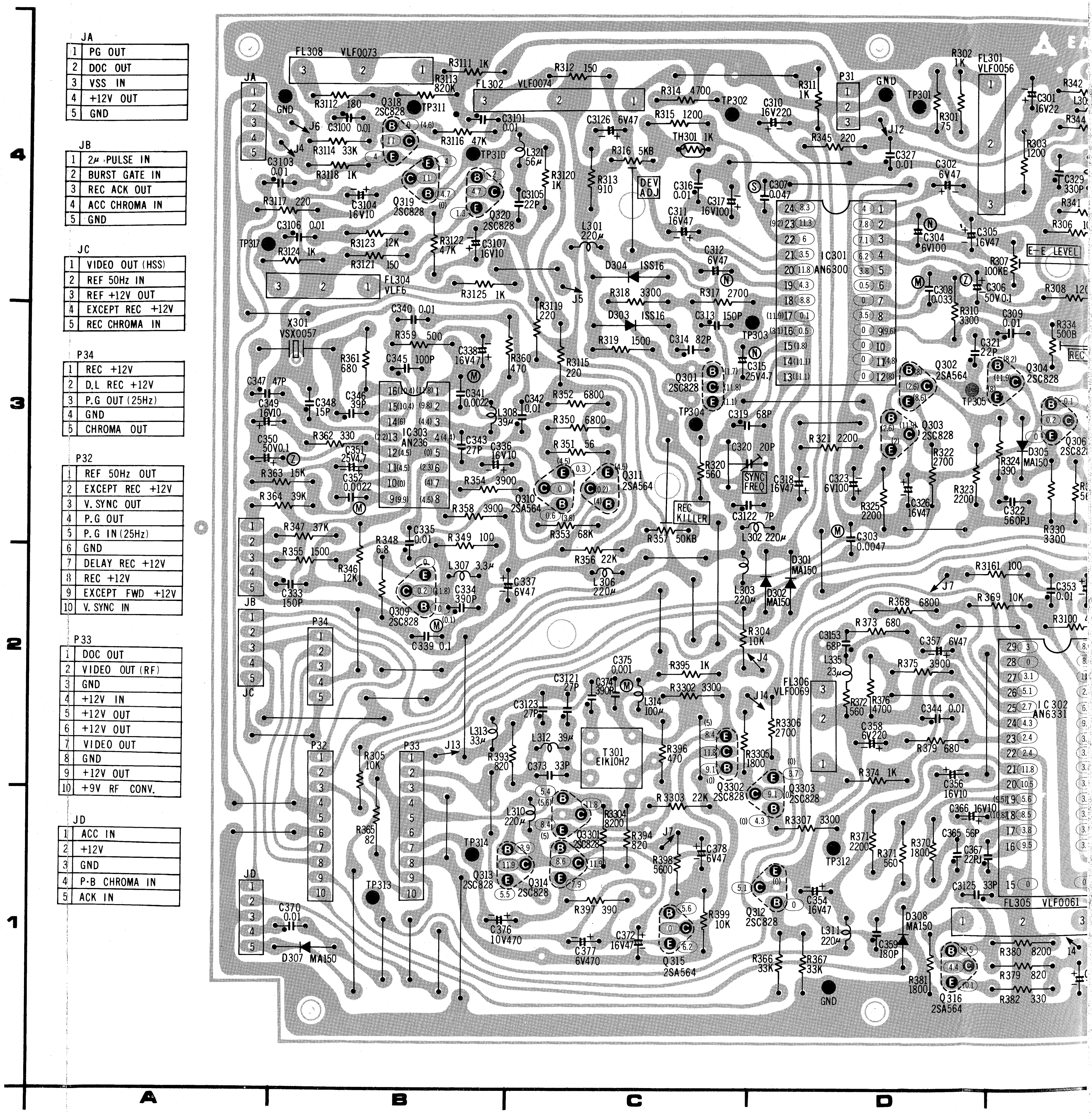
JC	
1	VIDEO OUT (HSS)
2	REF 50Hz IN
3	REF +12V OUT
4	EXCEPT REC +12V
5	REC CHROMA IN

P34	
1	REC +12V
2	D.L REC +12V
3	P.G OUT (25Hz)
4	GND
5	CHROMA OUT

P32	
1	REF 50Hz OUT
2	EXCEPT REC +12V
3	V. SYNC OUT
4	P.G OUT
5	P.G IN (25Hz)
6	GND
7	DELAY REC +12V
8	REC +12V
9	EXCEPT FWD +12V
10	V. SYNC IN

P33	
1	DOC OUT
2	VIDEO OUT (RF)
3	GND
4	+12V IN
5	+12V OUT
6	+12V OUT
7	VIDEO OUT
8	GND
9	+12V OUT
10	+9V RF CONV.

JD	
1	ACC IN
2	+12V
3	GND
4	P·B CHROMA IN
5	ACK IN


4
3
2
1
A
B
C
D
JA
JB
JC
JD
P31
P32
P33
P34
FL308 VLF0073
FL302 VLF0074
FL301 VLF0056
FL304 VLF6
FL306 VLF0069
FL305 VLF0061
IC301 AN6300
IC303 AN236
IC302 AN6331
X301 VSX0057
T301 EIK10H2
Q318 2SC828
Q319 2SC828
Q320 2SC828
Q301 2SC828
Q302 2SA564
Q303 2SC828
Q304 2SC828
Q309 2SC828
Q310 2SA564
Q311 2SA564
Q312 2SC828
Q313 2SC828
Q314 2SC828
Q315 2SA564
Q316 2SA564
Q3301 2SC828
Q3302 2SC828
Q3303 2SC828
D301 MA150
D302 MA150
D303 1SS16
D304 1SS16
D305 MA150
D307 MA150
D308 MA150
DEV ADJ
SYNC FREQ
REC KILLER
E-E LEVEL
TP301
TP302
TP303
TP304
TP305
TP310
TP311
TP312
TP313
TP314
TP317
GND

NCE PROCESS CIRCUIT BOARD (VEP0379A)

IN

IN

SS)

T

+12V

IN

V

z)

T

+12V

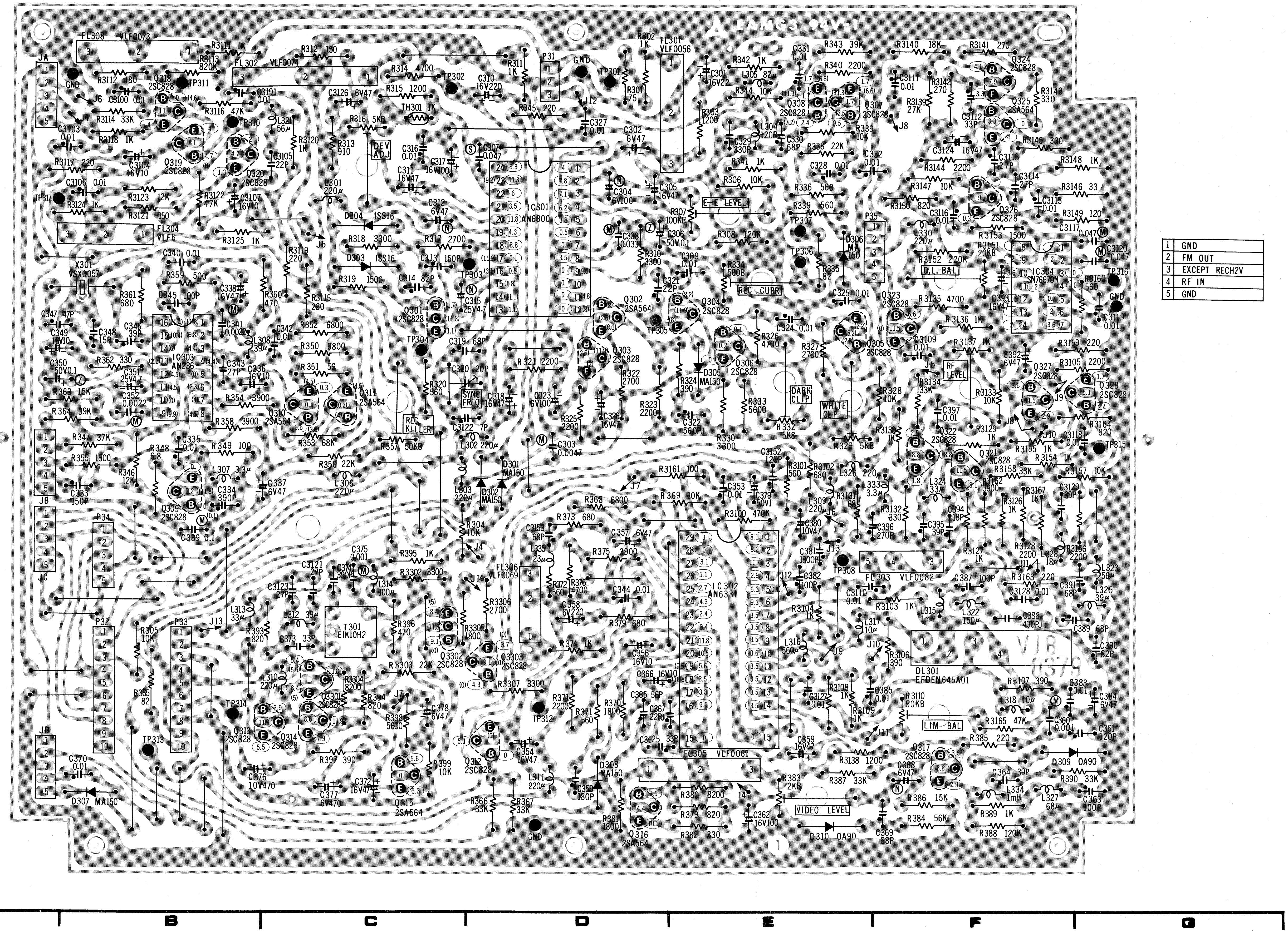
12V

+12V

F)

V.

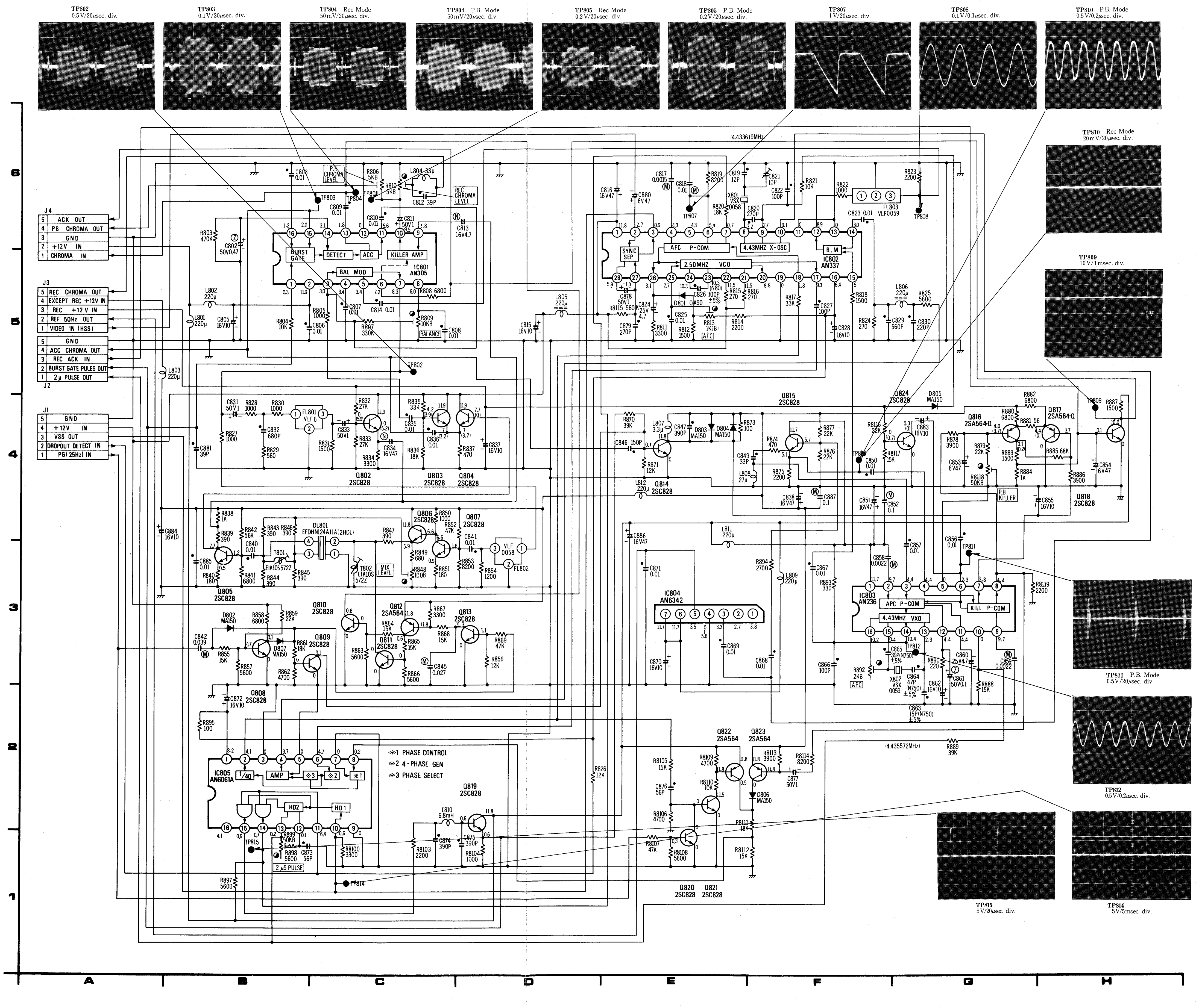
N



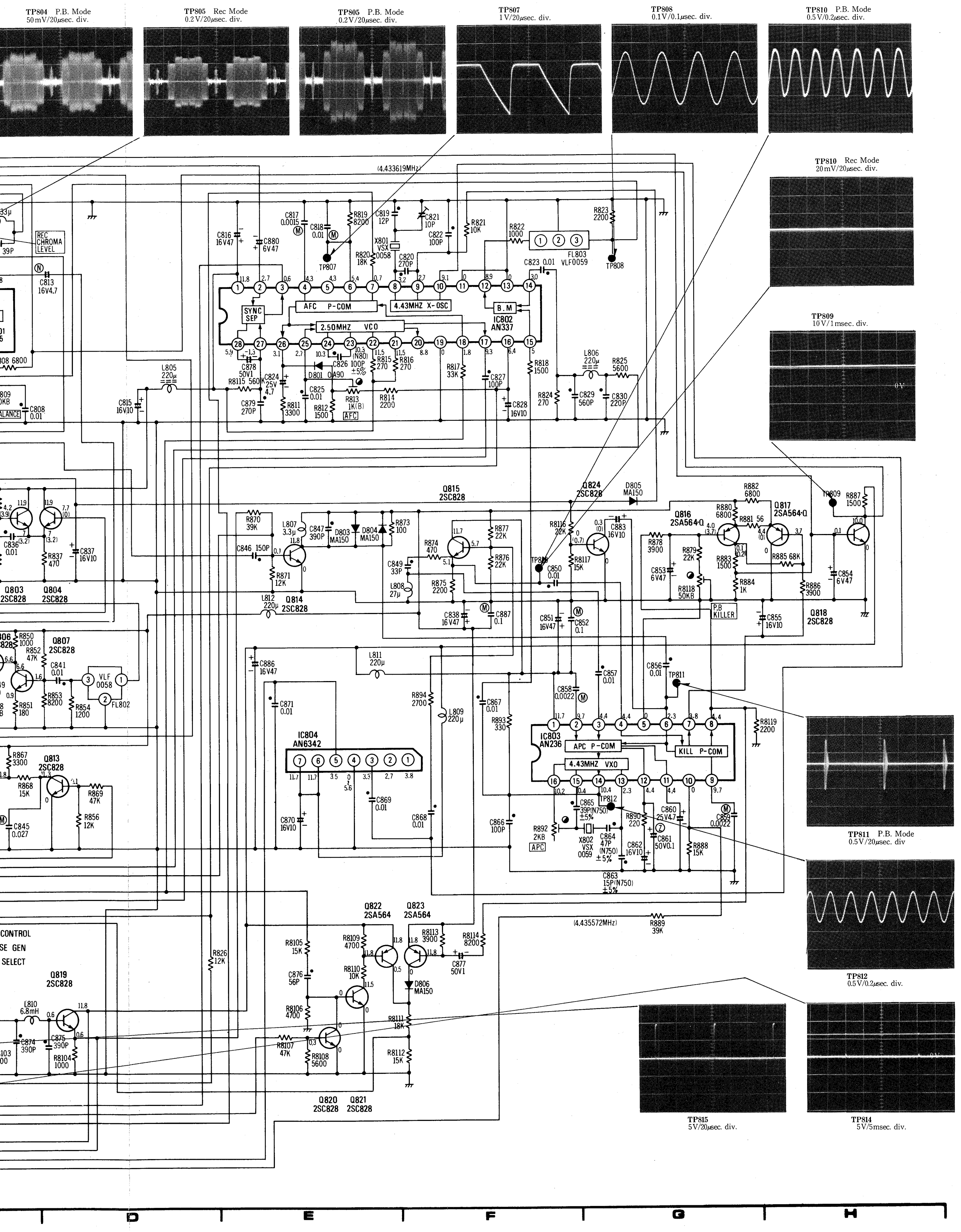
EAMG3 94V-1
FL308 VLF0073
FL302 VLF0074
FL301 VLF0056
FL304 VLF6
FL306 VLF0069
FL303 VLF0082
FL305 VLF0061
IC301 AN6300
IC302 AN6331
IC303 AN236
IC304 SN76670N
X301 VSX0057
T301 EIK10H2
DL301 EFDEN645A01
DEV ADJ
SYNC FREQ
REC KILLER
E-E LEVEL
REC CURR
D.L. BAL
DARK CLIP
WHITE CLIP
RF LEVEL
LIM BAL
VIDEO LEVEL
VJB 0379
JA
JB
JC
JD
P31
P32
P33
P34
P35
GND
TP301
TP302
TP303
TP304
TP305
TP306
TP307
TP308
TP310
TP311
TP312
TP313
TP314
TP315
TP316
TP317
A
B
C
D
E
F
G

1	GND
2	FM OUT
3	EXCEPT RECH2V
4	RF IN
5	GND

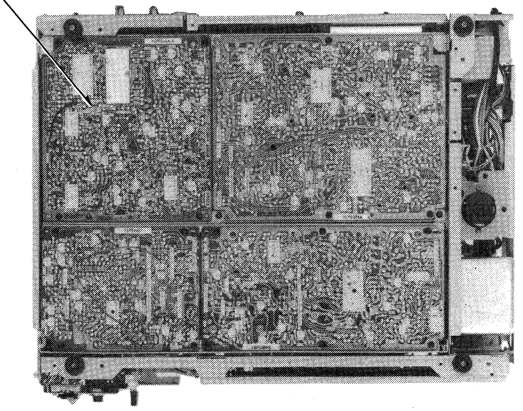
COLOUR PROCESS SCHEMATIC DIAGRAM


TP802 0.5V/20μsec. div.
TP803 0.1V/20μsec. div.
TP804 Rec Mode 50mV/20μsec. div.
TP804 P.B. Mode 50mV/20μsec. div.
TP805 Rec Mode 0.2V/20μsec. div.
TP805 P.B. Mode 0.2V/20μsec. div.
TP807 1V/20μsec. div.
TP808 0.1V/0.1μsec. div.
TP810 P.B. Mode 0.5V/0.2μsec. div.
TP810 Rec Mode 20mV/20μsec. div.
TP809 10V/1msec. div.
TP811 P.B. Mode 0.5V/20μsec. div
TP812 0.5V/0.2μsec. div.
TP815 5V/20μsec. div.
TP814 5V/5msec. div.
J4
5 ACK OUT
4 PB CHROMA OUT
3 GND
2 +12V IN
1 CHROMA IN
J3
5 REC CHROMA OUT
4 EXCEPT REC +12V IN
3 REC +12V IN
2 REF 50Hz OUT
1 VIDEO IN (HSS)
5 GND
4 ACC CHROMA OUT
3 REC ACK IN
2 BURST GATE PULES OUT
1 2μ PULSE OUT
J2
J1
5 GND
4 +12V IN
3 VSS OUT
2 DROPOUT DETECT IN
1 PG (25Hz) IN
IC801 AN305
BURST GATE
DETECT
ACC
KILLER AMP
BAL MOD
P.B. CHROMA LEVEL
REC CHROMA LEVEL
BALANCE
IC802 AN337
SYNC SEP
AFC P-COM
4.43MHZ X-OSC
B.M
2.50MHZ VCO
AFC
(4.433619MHz)
FL803 VLF0059
FL801 VLF6
Q802 2SC828
Q803 2SC828
Q804 2SC828
Q805 2SC828
Q806 2SC828
Q807 2SC828
DL801 EFDHN124A1A (2HDL)
T801 EIKIDS572Z
T802 EIKIDS572Z
MIX LEVEL
VLF 0058
FL802
Q810 2SC828
Q811 2SC828
Q812 2SA564
Q813 2SC828
Q808 2SC828
Q809 2SC828
D802 MA150
D807 MA150
IC805 AN6061A
1/40
AMP
※3
※2
※1
HD2
HD1
2μS PULSE
※1 PHASE CONTROL
※2 4-PHASE GEN
※3 PHASE SELECT
Q819 2SC828
L810 6.8mH
IC804 AN6342
Q814 2SC828
Q815 2SC828
D803 MA150
D804 MA150
Q824 2SC828
D805 MA150
Q816 2SA564-Q
Q817 2SA564-Q
Q818 2SC828
P.B KILLER
IC803 AN236
APC P-COM
KILL P-COM
4.43MHZ VXO
X802 VSX 0059
APC
(4.435572MHz)
Q822 2SA564
Q823 2SA564
D806 MA150
Q820 2SC828
Q821 2SC828
TP802
TP803
TP804
TP805
TP807
TP808
TP809
TP810
TP811
TP812
TP814
TP815
A
B
C
D
E
F
G
H
1
2
3
4
5
6

C DIAGRAM



TP804 P.B. Mode 50mV/20μsec. div.
TP805 Rec Mode 0.2V/20μsec. div.
TP805 P.B. Mode 0.2V/20μsec. div.
TP807 1V/20μsec. div.
TP808 0.1V/0.1μsec. div.
TP810 P.B. Mode 0.5V/0.2μsec. div.
TP810 Rec Mode 20mV/20μsec. div.
TP809 10V/1msec. div.
TP811 P.B. Mode 0.5V/20μsec. div
TP812 0.5V/0.2μsec. div.
TP815 5V/20μsec. div.
TP814 5V/5msec. div.
IC802 AN337
SYNC SEP
AFC P-COM
4.43MHZ X-OSC
2.50MHZ VCO
B.M
IC803 AN236
APC P-COM
4.43MHZ VXO
KILL P-COM
IC804 AN6342
Q803 2SC828
Q804 2SC828
Q807 2SC828
Q813 2SC828
Q814 2SC828
Q815 2SC828
Q816 2SA564-Q
Q817 2SA564-Q
Q818 2SC828
Q819 2SC828
Q820 2SC828
Q821 2SC828
Q822 2SA564
Q823 2SA564
Q824 2SC828
(4.433619MHz)
(4.435572MHz)
REC CHROMA LEVEL
P.B KILLER
CONTROL
SE GEN
SELECT
D
E
F
G
H

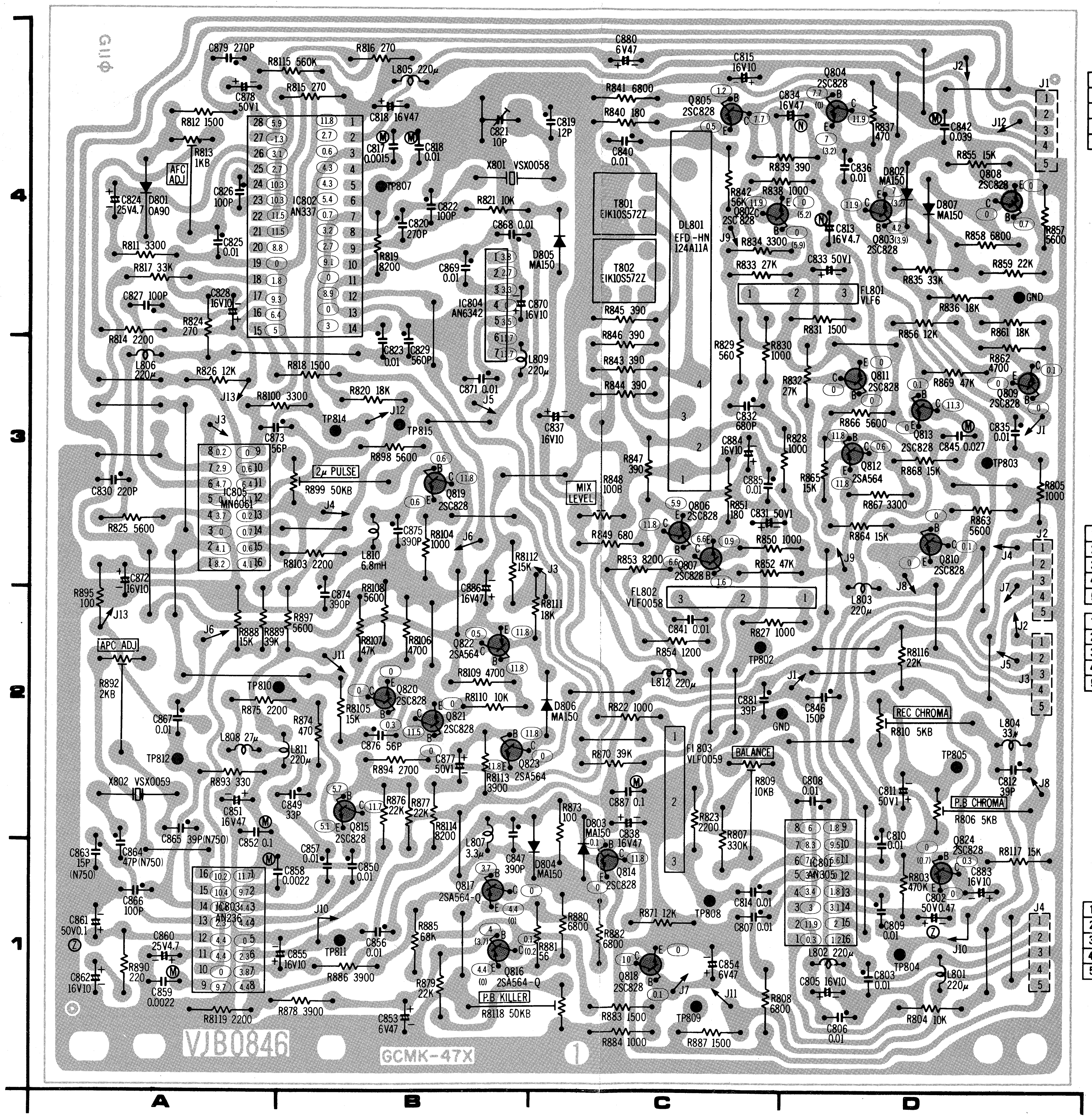


Colour Process Circuit Board (VEP0846A)

Colour Process Circuit Board

Q802	C-4
Q803	D-4
Q804	D-4
Q805	C-4
Q806	C-3
Q807	C-3
Q808	D-4
Q809	D-3
Q810	D-3
Q811	D-3
Q812	D-3
Q813	D-3
Q814	C-1
Q815	B-2
Q816	B-1
Q817	B-1
Q818	C-1
Q819	B-3
Q820	B-2
Q821	B-2
Q822	B-2
Q823	B-2
Q824	D-1
IC801	D-1
IC802	A-4
IC803	A-1
IC804	B-4
IC805	A-3

COLOUR PROCESS CIRCUIT BOARD (VEP0846)



VJB0846
GCMK-47X
IC802 AN337
IC803 AN236
IC804 AN6342
IC805 MN6061
IC806 AN305
X801 VSX0058
X802 VSX0059
DL801 EFD-HN 124A11A
T801 EIK10S572Z
T802 EIK10S572Z
FL801 VLF6
FL802 VLF0058
FL803 VLF0059
Q804 2SC828
Q805 2SC828
Q806 2SC828
Q807 2SC828
Q808 2SC828
Q809 2SC828
Q810 2SC828
Q811 2SC828
Q812 2SA564
Q813 2SC828
Q814 2SC828
Q815 2SC828
Q816 2SA564-Q
Q817 2SA564-Q
Q818 2SC828
Q819 2SC828
Q820 2SC828
Q821 2SC828
Q822 2SA564
Q823 2SA564
Q824 2SC828
D801 OA90
D802 MA150
D803 MA150
D804 MA150
D805 MA150
D806 MA150
D807 MA150
AFC ADJ
APC ADJ
2μ PULSE
MIX LEVEL
BALANCE
REC CHROMA
P.B CHROMA
P.B KILLER
TP802
TP803
TP804
TP805
TP807
TP808
TP809
TP810
TP811
TP812
TP814
TP815
GND
J1
J2
J3
J4
A
B
C
D
1
2
3
4

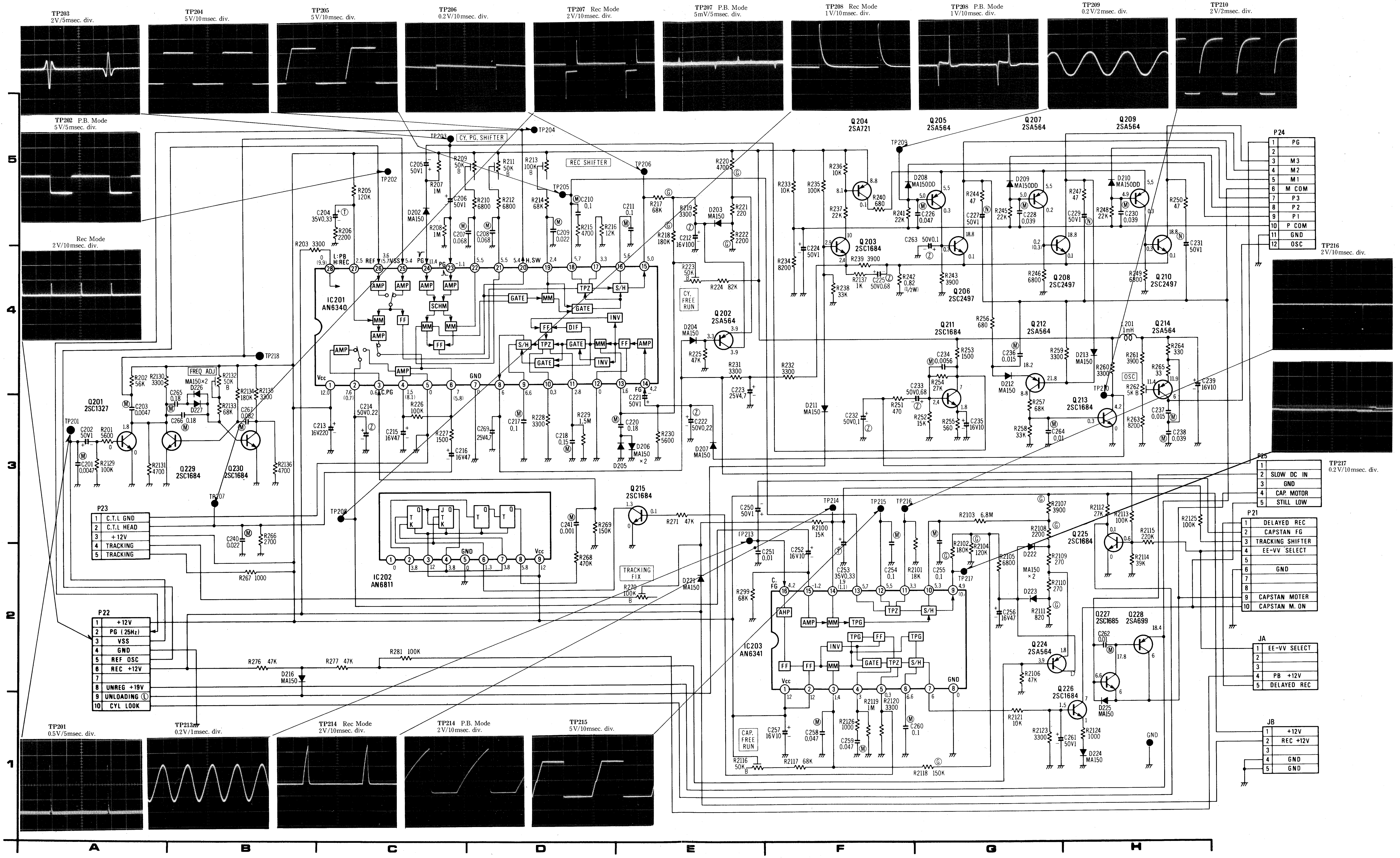
1	PG(25Hz) IN
2	DROP OUT DETECT IN
3	
4	+12V IN
5	GND

1	2μ PULSE OUT
2	BURST GATE PULSE OUT
3	REC ACK IN.
4	ACC CHROMA OUT
5	GND

1	VIDEO IN(H S S)
2	REF 50Hz OUT
3	REC +12V IN
4	EXCEPT REC +12V IN
5	REC CHROMA OUT

1	CHROMA IN
2	+12V IN
3	GND
4	P.B CHROMA OUT
5	ACK OUT

SERVO CONTROL SCHEMATIC DIAGRAM


TP203 2V/5msec. div.
TP204 5V/10msec. div.
TP205 5V/10msec. div.
TP206 0.2V/10msec. div.
TP207 Rec Mode 2V/10msec. div.
TP207 P.B. Mode 5mV/5msec. div.
TP208 Rec Mode 1V/10msec. div.
TP208 P.B. Mode 1V/10msec. div.
TP209 0.2V/2msec. div.
TP210 2V/2msec. div.
TP202 P.B. Mode 5V/5msec. div.
Rec Mode 2V/10msec. div.
TP216 2V/10msec. div.
TP217 0.2V/10msec. div.
TP201 0.5V/5msec. div.
TP213 0.2V/1msec. div.
TP214 Rec Mode 2V/10msec. div.
TP214 P.B. Mode 2V/10msec. div.
TP215 5V/10msec. div.
CY. PG. SHIFTER
REC SHIFTER
FREQ ADJ
CY. FREE RUN
TRACKING FIX
CAP. FREE RUN
IC201 AN6340
IC202 AN6811
IC203 AN6341
Q201 2SC1327
Q229 2SC1684
Q230 2SC1684
Q202 2SA564
Q203 2SC1684
Q204 2SA721
Q205 2SA564
Q206 2SC2497
Q207 2SA564
Q208 2SC2497
Q209 2SA564
Q210 2SC2497
Q211 2SC1684
Q212 2SA564
Q213 2SC1684
Q214 2SA564
Q215 2SC1684
Q224 2SA564
Q225 2SC1684
Q226 2SC1684
Q227 2SC1685
Q228 2SA699
P24
1 PG
2
3 M3
4 M2
5 M1
6 M COM
7 P3
8 P2
9 P1
10 P COM
11 GND
12 OSC
P23
1 C.T.L GND
2 C.T.L HEAD
3 +12V
4 TRACKING
5 TRACKING
P22
1 +12V
2 PG (25Hz)
3 VSS
4 GND
5 REF OSC
6 REC +12V
7
8 UNREG +19V
9 UNLOADING Ⓛ
10 CYL LOOK
P25
1
2 SLOW DC IN
3 GND
4 CAP. MOTOR
5 STILL LOW
P21
1 DELAYED REC
2 CAPSTAN FG
3 TRACKING SHIFTER
4 EE-VV SELECT
5
6 GND
7
8
9 CAPSTAN MOTER
10 CAPSTAN M. ON
JA
1 EE-VV SELECT
2
3
4 PB +12V
5 DELAYED REC
JB
1 +12V
2 REC +12V
3
4 GND
5 GND
5
4
3
2
1
A
B
C
D
E
F
G
H

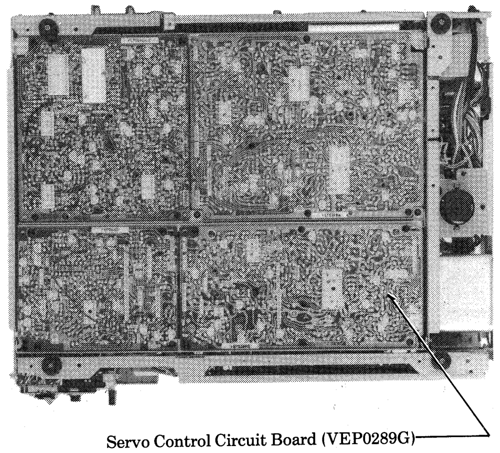
P21 (Servo Control)		
PIN NO.	SIGNAL NAME	DESTINATION
1	Delayed Rec	P32-7 (Luminance Process)
2	Capstan Fg	P605-1 (Capstan Motor)
3	—	—
4	E-E, V-V Select	P32-9(Luminance Process)
5	—	—
6	Gnd	P32-6 (Luminance Process)
7	—	—
8	—	—
9	Capstan Motor	P605-4 (Capstan Motor)
10	Capstan M. On	P65-3 (Transport Circuit)

P22 (Servo Control)		
PIN NO.	SIGNAL NAME	DESTINATION
1	+12V	P62-9 (Transport Circuit)
2	PG (25Hz)	P32-5 (Luminance Process)
3	Vss	P32-3 (Luminance Process)
4	Gnd	P65-6 (Transport Circuit)
5	Ref OSC	P32-1 (Luminance Process)
6	Rec +12V	P32-8 (Luminance Process)
7	—	—
8	Unreg +19V	P65-1 (Transport Circuit)
9	Unloading (L)	P63-2 (Transport Circuit)
10	Cyl Look	P65-2 (Transport Circuit)

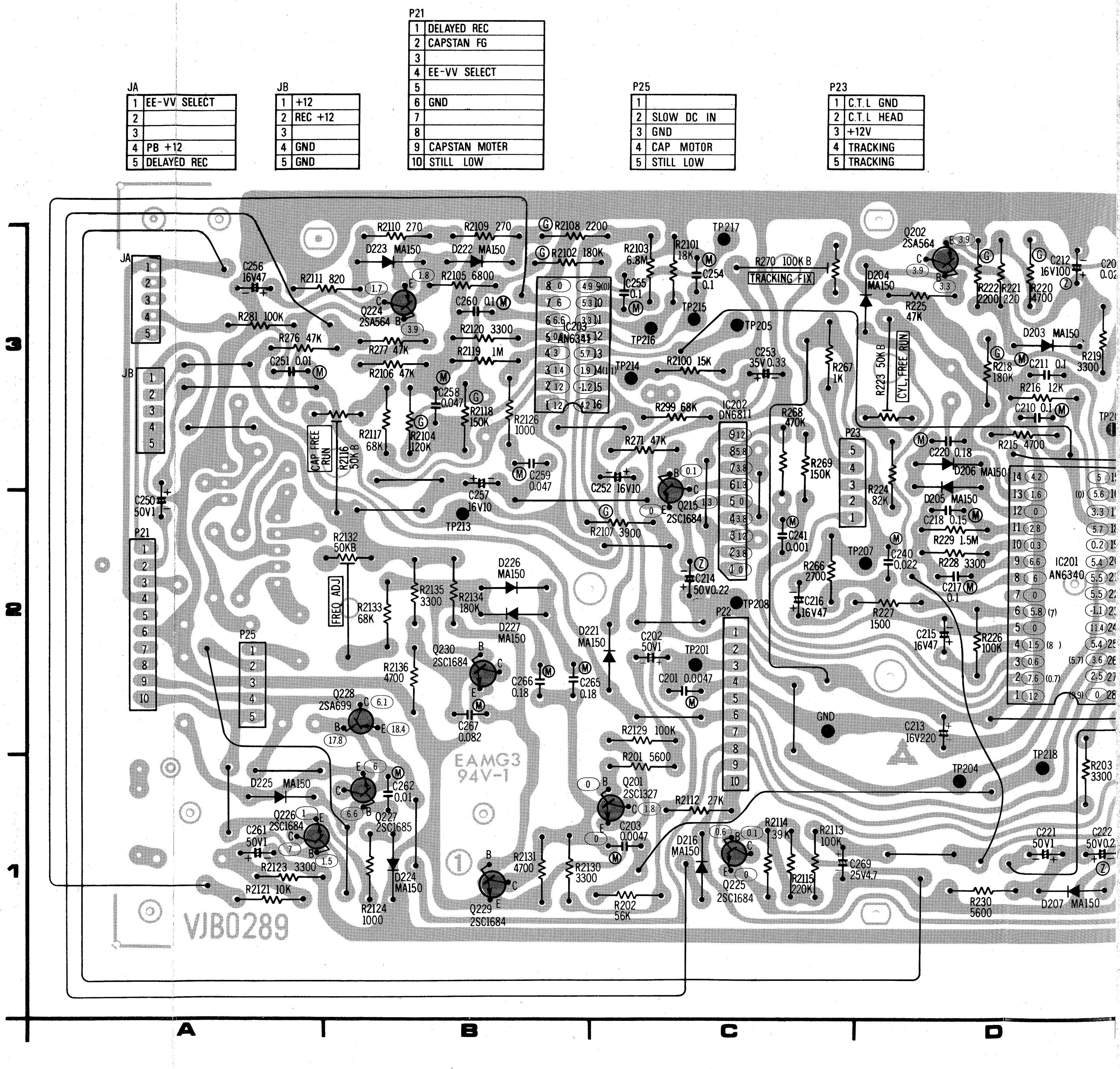
P23 (Servo Control)		
PIN NO.	SIGNAL NAME	DESTINATION
1	C.T.L. Gnd	P612-2 (A/C Head Connection)
2	C.T.L. Head	P612-1 (A/C Head Connection)
3	+12V	P614-1 (Reel Sensor)
4	Tracking	R6300 (Tracking)
5	Tracking	R6300 (Tracking)

P25 (Servo Control)		
PIN NO.	SIGNAL NAME	DESTINATION
1	—	—
2	Slow DC In	P641-7 (Still Section)
3	Gnd	P641-8 (Still Section)
4	Cap Motor	P641-10 (Still Section)
5	Still (L)	P641-6 (Still Section)

Servo Control Circuit Board	
Q201	C-1
Q202	D-3
Q203	E-1
Q204	E-2
Q205	F-3
Q206	F-2
Q207	F-3
Q208	F-1
Q209	F-3
Q210	F-1
Q211	E-2
Q212	F-1
Q213	E-1
Q214	F-3
Q215	C-2
Q224	B-3
Q225	C-1
Q226	A-1
Q227	B-1
Q228	B-2
Q229	B-1
Q230	B-2


Servo Control Circuit Board (VEP0289G)

SERVO CONTROL CIRCUIT BOARD (VEP0289G)


P21
1 DELAYED REC
2 CAPSTAN FG
3
4 EE-VV SELECT
5
6 GND
7
8
9 CAPSTAN MOTER
10 STILL LOW
JA
1 EE-VV SELECT
2
3
4 PB +12
5 DELAYED REC
JB
1 +12
2 REC +12
3
4 GND
5 GND
P25
1
2 SLOW DC IN
3 GND
4 CAP MOTOR
5 STILL LOW
P23
1 C.T.L GND
2 C.T.L HEAD
3 +12V
4 TRACKING
5 TRACKING
IC203 AN6345
IC202 DN6811
IC201 AN6340
TRACKING FIX
CYL FREE RUN
CAP FREE RUN
FREQ ADJ
TP201
TP204
TP205
TP207
TP208
TP213
TP214
TP215
TP216
TP217
TP218
GND
EAMG3 94V-1
VJB0289
3
2
1
A
B
C
D

SERVO CONTROL CIRCUIT BOARD (VEP0289G)

JA

1	EE-VV SELECT
2	
3	
4	PB +12
5	DELAYED REC

JB

1	+12
2	REC +12
3	
4	GND
5	GND

P21

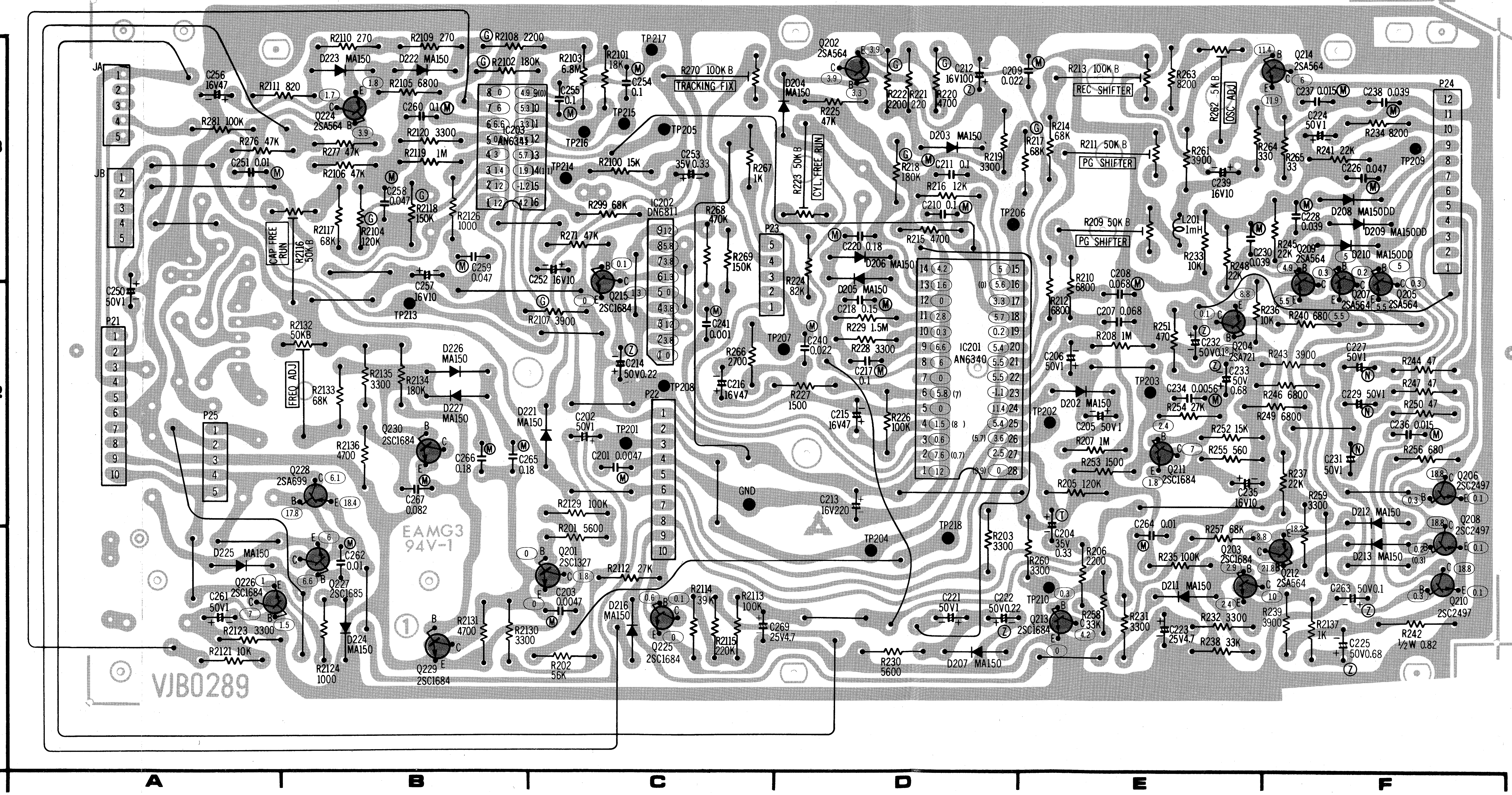
1	DELAYED REC
2	CAPSTAN FG
3	
4	EE-VV SELECT
5	
6	GND
7	
8	
9	CAPSTAN MOTER
10	STILL LOW

P25

1	
2	SLOW DC IN
3	GND
4	CAP MOTOR
5	STILL LOW

P23

1	C.T.L GND
2	C.T.L HEAD
3	+12V
4	TRACKING
5	TRACKING


JA
JB
P21
P25
P23
P24
P22
R2110 270
R2109 270
R2108 2200
D223 MA150
D222 MA150
R2102 180K
R2103 6.8M
R2101 18K
TP217
R270 100K B
TRACKING FIX
Q202 2SA564
D204 MA150
R222 2200
R221 220
R220 4700
C212 16V100
C209 0.022
R213 100K B
REC SHIFTER
R263 8200
R262 5K B
OSC ADJ
Q214 2SA564
C237 0.015
C238 0.039
C256 16V47
R2111 820
Q224 2SA564
R2105 6800
C260 0.1
IC203 AN6341
C255 0.1
C254 0.1
TP215
TP205
R225 47K
D203 MA150
R219 3300
R217 68K
R214 68K
R211 50K B
PG SHIFTER
R261 3900
R264 330
R265 33
C224 50V1
R234 8200
R241 22K
C226 0.047
TP209
R281 100K
R276 47K
R277 47K
R2120 3300
R2119 1M
TP216
R2100 15K
C253 35V0.33
R267 1K
R223 50K B
CYL FREE RUN
R218 180K
C211 0.1
R216 12K
C239 16V10
C251 0.01
R2106 47K
C258 0.047
R2118 150K
R2126 1000
TP214
R299 68K
IC202 DN6811
R268 470K
C210 0.1
TP206
R209 50K B
PG SHIFTER
L201 1mH
R245 22K
C228 0.039
D208 MA150DD
D209 MA150DD
R2117 68K
R2104 120K
R2116 50K B
CAP FREE RUN
C259 0.047
R271 47K
C252 16V10
Q215 2SC1684
R269 150K
C220 0.18
R215 4700
D206 MA150
R224 82K
R233 10K
C230 0.039
R248 22K
Q209 2SA564
D210 MA150DD
Q207 2SA564
Q205 2SA564
C250 50V1
C257 16V10
TP213
R2107 3900
D205 MA150
C218 0.15
IC201 AN6340
R210 6800
C208 0.068
R212 6800
R236 10K
R240 680
R2132 50K B
FREQ ADJ
C241 0.001
TP207
C240 0.022
R229 1.5M
R228 3300
C217 0.1
C207 0.068
R208 1M
R251 470
C232 50V0.18
Q204 2SA721
R243 3900
C227 50V1
R244 47
D226 MA150
D227 MA150
R2133 68K
R2135 3300
R2134 180K
C214 50V0.22
TP208
R266 2700
C216 16V47
R227 1500
C206 50V1
TP203
D202 MA150
C234 0.0056
C233 50V 0.68
R246 6800
R247 47
C229 50V1
R254 27K
R249 6800
R250 47
D221 MA150
C202 50V1
TP201
C215 16V47
R226 100K
TP202
C205 50V1
C236 0.015
R252 15K
R255 560
Q211 2SC1684
R207 1M
R253 1500
R237 22K
C231 50V1
R256 680
Q230 2SC1684
R2136 4700
C266 0.18
C265 0.18
C201 0.0047
GND
R205 120K
C235 16V10
R259 3300
Q206 2SC2497
Q228 2SA699
C267 0.082
EAMG3 94V-1
R2129 100K
R201 5600
C213 16V220
TP218
R203 3300
C204 35V 0.33
C264 0.01
R257 68K
D212 MA150
Q208 2SC2497
D225 MA150
C262 0.01
Q227 2SC1685
Q201 2SC1327
R2112 27K
TP204
R260 3300
R206 2200
R235 100K
Q203 2SC1684
Q212 2SA564
D213 MA150
Q226 2SC1684
C261 50V1
R2123 3300
C203 0.0047
D216 MA150
R2114 39K
R2113 100K
C269 25V4.7
C221 50V1
C222 50V0.22
TP210
Q213 2SC1684
R258 33K
R231 3300
D211 MA150
C263 50V0.1
Q210 2SC2497
R2121 10K
D224 MA150
R2124 1000
R2131 4700
R2130 3300
Q229 2SC1684
R202 56K
Q225 2SC1684
R2115 220K
R230 5600
D207 MA150
C223 25V4.7
R232 3300
R238 33K
R239 3900
R2137 1K
C225 50V0.68
R242 ½W 0.82
VJB0289
1
2
3
A
B
C
D
E
F

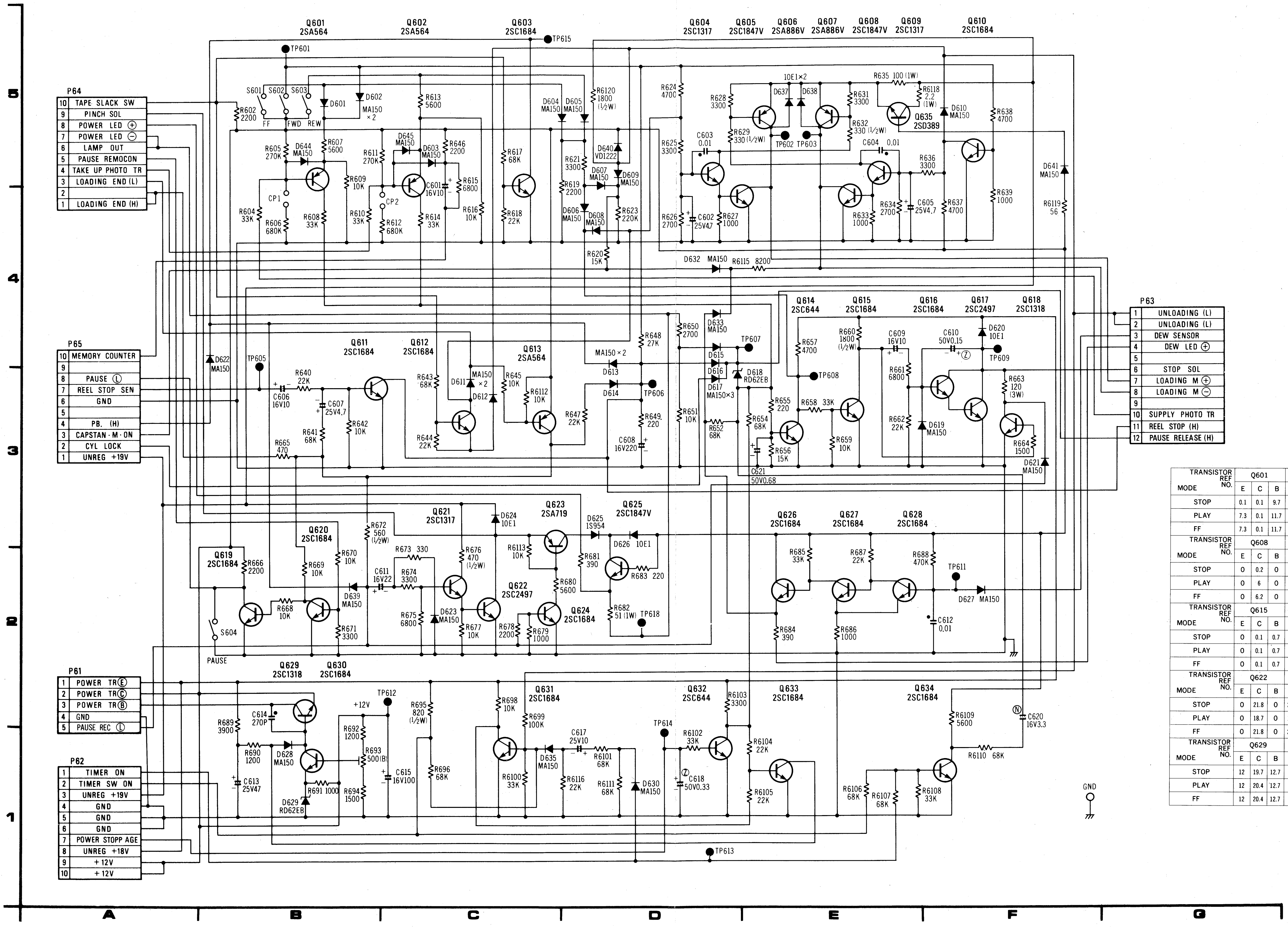
P24

1	PG
2	
3	M3
4	M2
5	M1
6	M COM
7	P3
8	P2
9	P1
10	P COM
11	GND
12	OSC

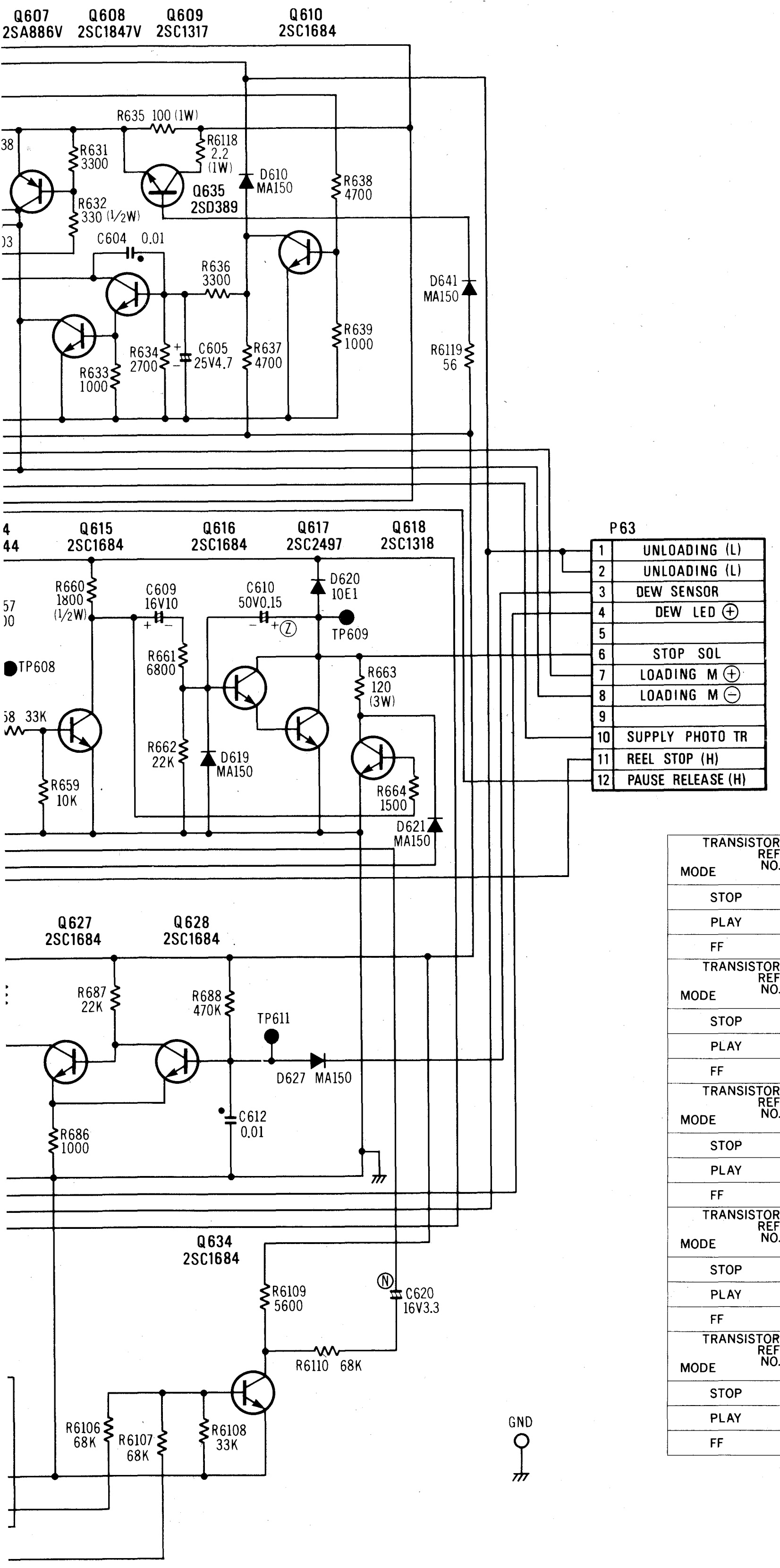
P22

1	+12V	
2	PG (25Hz)	
3	VSS	
4	GND	
5	REF OSC	
6	REC +12V	
7		
8	UNREG	+19V
9	UNLOADING L	
10	CYL LOOK	

REGULATOR & TRANSPORT SCHEMATIC DIAGRAM


5
4
3
2
1
A
B
C
D
E
F
G
P64
10 TAPE SLACK SW
9 PINCH SOL
8 POWER LED ⊕
7 POWER LED ⊖
6 LAMP OUT
5 PAUSE REMOCON
4 TAKE UP PHOTO TR
3 LOADING END (L)
2
1 LOADING END (H)
P65
10 MEMORY COUNTER
9
8 PAUSE Ⓛ
7 REEL STOP SEN
6 GND
5
4 PB. (H)
3 CAPSTAN·M·ON
2 CYL LOCK
1 UNREG +19V
P61
1 POWER TRⒺ
2 POWER TRⒸ
3 POWER TRⒷ
4 GND
5 PAUSE REC Ⓛ
P62
1 TIMER ON
2 TIMER SW ON
3 UNREG +19V
4 GND
5 GND
6 GND
7 POWER STOPP AGE
8 UNREG +18V
9 + 12V
10 + 12V
P63
1 UNLOADING (L)
2 UNLOADING (L)
3 DEW SENSOR
4 DEW LED ⊕
5
6 STOP SOL
7 LOADING M ⊕
8 LOADING M ⊖
9
10 SUPPLY PHOTO TR
11 REEL STOP (H)
12 PAUSE RELEASE (H)
Q601 2SA564
Q602 2SA564
Q603 2SC1684
Q604 2SC1317
Q605 2SC1847V
Q606 2SA886V
Q607 2SA886V
Q608 2SC1847V
Q609 2SC1317
Q610 2SC1684
Q635 2SD389
Q611 2SC1684
Q612 2SC1684
Q613 2SA564
Q614 2SC644
Q615 2SC1684
Q616 2SC1684
Q617 2SC2497
Q618 2SC1318
Q619 2SC1684
Q620 2SC1684
Q621 2SC1317
Q622 2SC2497
Q623 2SA719
Q624 2SC1684
Q625 2SC1847V
Q626 2SC1684
Q627 2SC1684
Q628 2SC1684
Q629 2SC1318
Q630 2SC1684
Q631 2SC1684
Q632 2SC644
Q633 2SC1684
Q634 2SC1684
TP601
TP602
TP603
TP605
TP606
TP607
TP608
TP609
TP611
TP612
TP613
TP614
TP615
TP618
S601
S602
S603
FF
FWD
REW
S604
PAUSE
CP1
CP2
R602 2200
R604 33K
R605 270K
R606 680K
R607 5600
R608 33K
R609 10K
R610 33K
R611 270K
R612 680K
R613 5600
R614 33K
R615 6800
R616 10K
R617 68K
R618 22K
R619 2200
R620 15K
R621 3300
R623 220K
R624 4700
R625 3300
R626 2700
R627 1000
R628 3300
R629 330 (1/2W)
R631 3300
R632 330 (1/2W)
R633 1000
R634 2700
R635 100 (1W)
R636 3300
R637 4700
R638 4700
R639 1000
R640 22K
R641 68K
R642 10K
R643 68K
R644 22K
R645 10K
R646 2200
R647 22K
R648 27K
R649 220
R650 2700
R651 10K
R652 68K
R654 68K
R655 220
R656 15K
R657 4700
R658 33K
R659 10K
R660 1800 (1/2W)
R661 6800
R662 22K
R663 120 (3W)
R664 1500
R665 470
R666 2200
R668 10K
R669 10K
R670 10K
R671 3300
R672 560 (1/2W)
R673 330
R674 3300
R675 6800
R676 470 (1/2W)
R677 10K
R678 2200
R679 1000
R680 5600
R681 390
R682 51 (1W)
R683 220
R684 390
R685 33K
R686 1000
R687 22K
R688 470K
R689 3900
R690 1200
R691 1000
R692 1200
R693 500(B)
R694 1500
R695 820 (1/2W)
R696 68K
R698 10K
R699 100K
R6100 33K
R6101 68K
R6102 33K
R6103 3300
R6104 22K
R6105 22K
R6106 68K
R6107 68K
R6108 33K
R6109 5600
R6110 68K
R6111 68K
R6112 10K
R6113 10K
R6115 8200
R6116 22K
R6118 2.2 (1W)
R6119 56
R6120 1800 (1/2W)
C601 16V10
C602 25V47
C603 0.01
C604 0.01
C605 25V4.7
C606 16V10
C607 25V4.7
C608 16V220
C609 16V10
C610 50V0.15
C611 16V22
C612 0.01
C613 25V47
C614 270P
C615 16V100
C617 25V10
C618 50V0.33
C620 16V3.3
C621 50V0.68
D601
D602 MA150 ×2
D603 MA150
D604 MA150
D605 MA150
D606 MA150
D607 MA150
D608 MA150
D609 MA150
D610 MA150
D611 MA150 ×2
D612
D613
D614
MA150 × 2
D615
D616
D617 MA150×3
D618 RD62EB
D619 MA150
D620 10E1
D621 MA150
D622 MA150
D623 MA150
D624 10E1
D625 1S954
D626 10E1
D627 MA150
D628 MA150
D629 RD62EB
D630 MA150
D632 MA150
D633 MA150
D635 MA150
D637
D638
10E1×2
D640 VD1222
D641 MA150
D644 MA150
D645 MA150
D639 MA150
+12V
GND

TRANSISTOR REF NO. / MODE	Q601			Q602			Q603			Q604			Q605			Q606			Q
	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E
STOP	0.1	0.1	9.7	0	0.1	1.5	0	0	0.6	0	21.8	0.2	0	0.2	0	21.7	0.2	21.7	21.7
PLAY	7.3	0.1	11.7	0.1	0.1	9.5	0	11.3	0	0	20.3	0.2	0	6	0	20.3	6	20.3	20.3
FF	7.3	0.1	11.7	0.1	0.1	9.5	0	0	0.6	0	21.8	0.2	0	6.2	0	20.8	6	20.8	20.9
TRANSISTOR REF NO. / MODE	Q608			Q609			Q610			Q611			Q612			Q613			Q
	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E
STOP	0	0.2	0	0	21.7	0.3	0	0.7	0	0	0.2	0	0.4	0.4	1	12	0	12	0
PLAY	0	6	0	0	20.4	0	0	0	0.7	0	0～1.2	0～1.2	0	0.7	0	12	12	11.3	0
FF	0	6.2	0	0	21.8	0.3	0	0.7	0	0	0	−0.4	0.3	0.3	1	12	12	12	0
TRANSISTOR REF NO. / MODE	Q615			Q616			Q617			Q618			Q619			Q620			Q
	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E
STOP	0	0.1	0.7	0	20.7	0	0	20.7	0	0	20.4	0.1	0	0.1	0.7	0	0	0.7	0
PLAY	0	0.1	0.7	0	21.2	0	0	21.2	0	0	21.2	0.1	0	11.3	0	0	0	0.7	0
FF	0	0.1	0.7	0	21.2	0	0	21.2	0	0	21.2	0.1	0	0.1	0.7	0	6.4	0.7	0
TRANSISTOR REF NO. / MODE	Q622			Q623			Q624			Q625			Q626			Q627			Q
	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E
STOP	0	21.8	0	21.6	0.1	21.6	0	21.6	0	11	11.2	11.7	0.4	12	0.8	0.8	0.8	1.5	0.8
PLAY	0	18.7	0	18.7	18.4	17.9	0	0	0.8	11.2	17.7	11.8	0.4	12	0.8	0.8	0.8	1.5	0.8
FF	0	21.8	0	21.8	0.1	21.8	0	21.6	0	11	11.2	11.7	0.4	12	0.8	0.8	0.8	1.5	0.8
TRANSISTOR REF NO. / MODE	Q629			Q630			Q631			Q632			Q633			Q634			
	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	
STOP	12	19.7	12.7	6.2	12.7	6.9	0	0	0.7	0	0.1	0.7	0	13.3	0.1	0	0	0.7	
PLAY	12	20.4	12.7	6.2	12.7	6.9	0	0	0.7	0	0.1	0.7	0	13.3	0.1	0	0	0.7	
FF	12	20.4	12.7	6.2	12.7	6.9	0	0	0.7	0	0.1	0.7	0	0.1	0.7	0	0	0.7	


Q607
2SA886V
Q608
2SC1847V
Q609
2SC1317
Q610
2SC1684
R635 100 (1W)
R631 3300
R6118 2.2 (1W)
Q635 2SD389
D610 MA150
R638 4700
R632 330 (1/2W)
C604 0.01
R636 3300
D641 MA150
R634 2700
C605 25V4.7
R637 4700
R639 1000
R6119 56
R633 1000
Q615
2SC1684
Q616
2SC1684
Q617
2SC2497
Q618
2SC1318
R660 1800 (1/2W)
C609 16V10
C610 50V0.15
D620 10E1
TP609
TP608
R661 6800
R663 120 (3W)
33K
R662 22K
D619 MA150
R664 1500
R659 10K
D621 MA150
P63
1 UNLOADING (L)
2 UNLOADING (L)
3 DEW SENSOR
4 DEW LED ⊕
5
6 STOP SOL
7 LOADING M ⊕
8 LOADING M ⊖
9
10 SUPPLY PHOTO TR
11 REEL STOP (H)
12 PAUSE RELEASE (H)
Q627
2SC1684
Q628
2SC1684
R687 22K
R688 470K
TP611
D627 MA150
C612 0.01
R686 1000
Q634
2SC1684
R6109 5600
C620 16V3.3
R6110 68K
R6106 68K
R6107 68K
R6108 33K
GND
E
F
G

TRANSISTOR REF NO. / MODE	Q601			Q602			Q603			Q604			Q605			Q606			Q607		
	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STOP	0.1	0.1	9.7	0	0.1	1.5	0	0	0.6	0	21.8	0.2	0	0.2	0	21.7	0.2	21.7	21.7	0.2	21.7
PLAY	7.3	0.1	11.7	0.1	0.1	9.5	0	11.3	0	0	20.3	0.2	0	6	0	20.3	6	20.3	20.3	0	20.3
FF	7.3	0.1	11.7	0.1	0.1	9.5	0	0	0.6	0	21.8	0.2	0	6.2	0	20.8	6	20.8	20.9	0	20.9

TRANSISTOR REF NO. / MODE	Q608			Q609			Q610			Q611			Q612			Q613			Q614		
	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STOP	0	0.2	0	0	21.7	0.3	0	0.7	0	0	0.2	0	0.4	0.4	1	12	0	12	0	18.5	0.1
PLAY	0	6	0	0	20.4	0	0	0	0.7	0	0~1.2	0~1.2	0	0.7	0	12	12	11.3	0	18.5	0.1
FF	0	6.2	0	0	21.8	0.3	0	0.7	0	0	0	−0.4	0.3	0.3	1	12	12	12	0	18.5	0.1

TRANSISTOR REF NO. / MODE	Q615			Q616			Q617			Q618			Q619			Q620			Q621		
	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STOP	0	0.1	0.7	0	20.7	0	0	20.7	0	0	20.4	0.1	0	0.1	0.7	0	0	0.7	0	21.8	0
PLAY	0	0.1	0.7	0	21.2	0	0	21.2	0	0	21.2	0.1	0	11.3	0	0	0	0.7	0	21.8	0
FF	0	0.1	0.7	0	21.2	0	0	21.2	0	0	21.2	0.1	0	0.1	0.7	0	6.4	0.7	0	21.8	0

TRANSISTOR REF NO. / MODE	Q622			Q623			Q624			Q625			Q626			Q627			Q628		
	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STOP	0	21.8	0	21.6	0.1	21.6	0	21.6	0	11	11.2	11.7	0.4	12	0.8	0.8	0.8	1.5	0.8	1.5	0.5
PLAY	0	18.7	0	18.7	18.4	17.9	0	0	0.8	11.2	17.7	11.8	0.4	12	0.8	0.8	0.8	1.5	0.8	1.5	0.5
FF	0	21.8	0	21.8	0.1	21.8	0	21.6	0	11	11.2	11.7	0.4	12	0.8	0.8	0.8	1.5	0.8	1.5	0.5

TRANSISTOR REF NO. / MODE	Q629			Q630			Q631			Q632			Q633			Q634					
	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B			
STOP	12	19.7	12.7	6.2	12.7	6.9	0	0	0.7	0	0.1	0.7	0	13.3	0.1	0	0	0.7			
PLAY	12	20.4	12.7	6.2	12.7	6.9	0	0	0.7	0	0.1	0.7	0	13.3	0.1	0	0	0.7			
FF	12	20.4	12.7	6.2	12.7	6.9	0	0	0.7	0	0.1	0.7	0	0.1	0.7	0	0	0.7			

P61 (Regulator & Transport)

PIN NO.	SIGNAL NAME	DESTINATION
1	Power TR (E)	P671-3
2	Power TR (C)	P671-2
3	Power TR (B)	P671-1
4	Gnd	—
5	Pause Rec (L)	P642-9 (Still Section)

P62 (Regulator & Transport)

PIN NO.	SIGNAL NAME	DESTINATION
1	Timer On	P6201-1 (Timer Section)
2	Timer SW On	P6201-2 (Timer Section)
3	Unreg +19V	P11-6 (Power Supply)
4	Gnd	P602-3 (Mic Jack Connection)
5	Gnd	P11-9 (Power Supply)
6	Gnd	P605-5 (Capstan Motor)
7	Power Stoppage	P11-7 (Power Supply)
8	Unreg +18V	P11-3 (Power Supply)
9	Unreg +12V	P22-1 (Control Section)
10	Unreg +12V	P33-4 (Colour Processing Section)

P63 (Regulator & Transport)

PIN NO.	SIGNAL NAME	DESTINATION
1	Unloading (L)	P606-3 (Leaf SW Connection)
2	Unloading (L)	P22-9 (Control Section)
3	Moist Senser	P607-3 (Loading Motor Connection)
4	Moist Lamp	P608-2 (Light Emitting Diode)
5	—	—
6	Stop Sol	P622-1 (Stop Solenoid)
7	Loading M (+)	P607-1 (Loading Motor Connection)
8	Loading M (−)	P607-2 (Loading Motor Connection)
9	—	—
10	Supply Photo	Q6302 (Supply Photo TR Connection)
11	Reel Stop (H)	P642-6 (Still Section)
12	Pause Release (H)	P642-7 (Still Section)

P64 (Regulator & Transport)

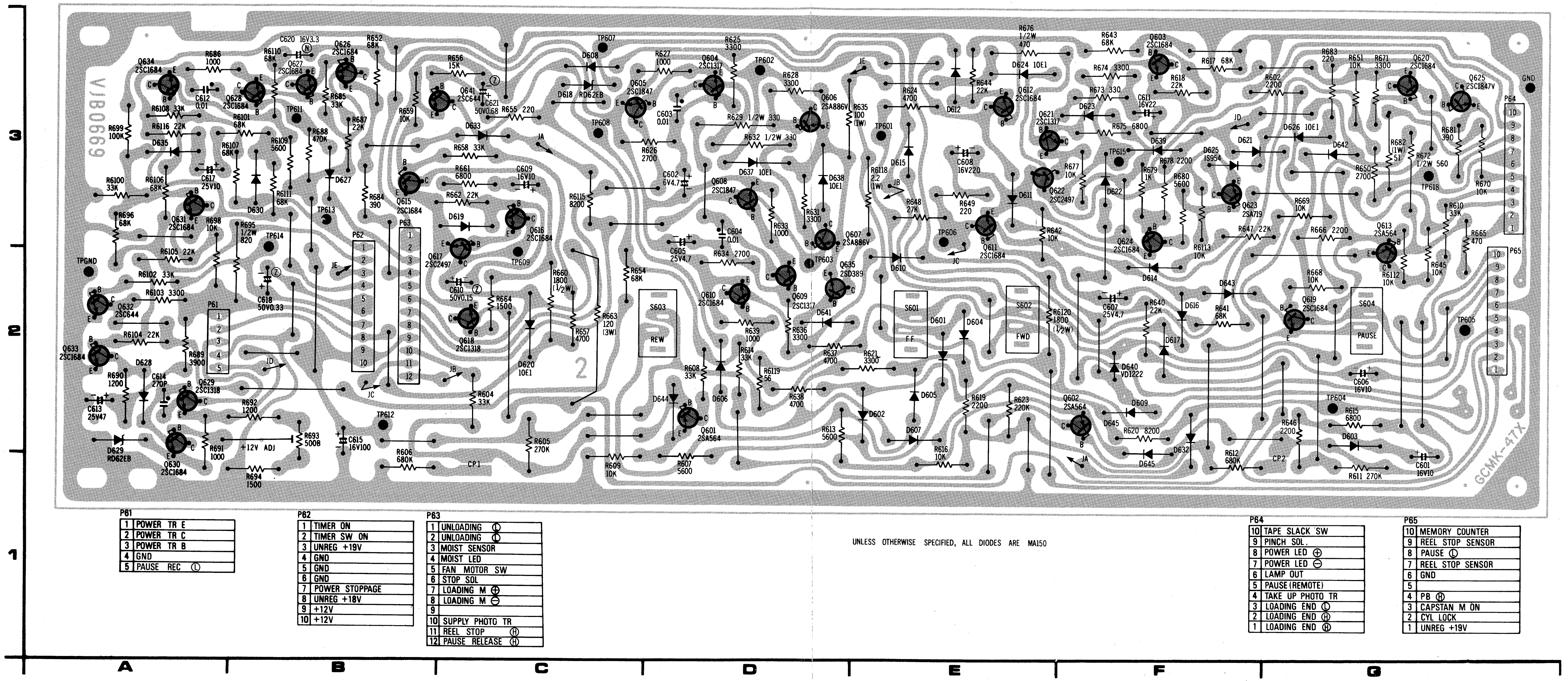
PIN NO.	SIGNAL NAME	DESTINATION
1	Loading End	P42-2 (Audio Section)
2	—	—
3	Loading End	P606-1 (Leaf SW Connection)
4	Take-up Photo TR	Q6303 (Take-up Photo TR Con.)
5	Pause Remote	P601-1 (Rear Jack Connection)
6	Lamp Out	P612-3 (AC Head Connection)
7	Power Led (−)	P608-3 (Light Emitting Diode)
8	Power Led (+)	P608-1 (Light Emitting Diode)
9	Pinch Sol	SL6302 (P. Solenoid)
10	Tape Slack SW	P613-3 (Micro Switch Connection)

P65 (Regulator & Transport)

PIN NO.	SIGNAL NAME	DESTINATION
1	Unreg +19V	P22-8 (Control Section)
2	Cyl Lock	P22-10 (Control Section)
3	Capstan M. On	P21-10 (Capstan Motor)
4	P.B. (H)	P44-4 (Audio Section)
5	—	—
6	Gnd	P22-4 (Control Section)
7	Reel Stop Sen	P614-3 (Reel Sensor Section)
8	Pause (L)	P42-1 (Audio Section)
9	Reel Sensor	P642-8 (Still Section)
10	Memory Counter	S6307 (Memory Counter Switch)

Regulator & Transport Circuit Board	
Q601	D-2
Q602	F-2
Q603	F-3
Q604	D-3
Q605	C-3
Q606	D-3
Q607	D-3
Q608	D-3
Q609	D-2
Q610	D-2
Q611	E-3
Q612	E-3
Q613	G-3
Q614	C-3
Q615	B-3
Q616	C-3
Q617	C-3
Q618	C-2
Q619	G-2
Q620	G-3
Q621	E-3
Q622	E-3
Q623	F-3
Q624	F-3
Q625	G-3
Q626	B-3
Q627	B-3
Q628	B-3
Q629	A-2
Q630	A-2
Q631	A-3
Q632	A-2
Q633	A-2
Q634	A-3

REGULATOR & TRANSPORT CIRCUIT BOARD (VEP0669H1)


3
2
1
A
B
C
D
E
F
G
VJB0669
GCMK-47X
GND
TPGND
P61
P62
P63
P64
P65
S601 FF
S602 FWD
S603 REW
S604 PAUSE
+12V ADJ
CP1
CP2
Q601 2SA564
Q602 2SA564
Q603 2SC1684
Q604 2SC1317
Q605 2SC1847
Q606 2SA886V
Q607 2SA886V
Q608 2SC1847
Q609 2SC1317
Q610 2SC1684
Q611 2SC1684
Q612 2SC1684
Q613 2SA564
Q615 2SC1684
Q616 2SC1684
Q617 2SC2497
Q618 2SC1318
Q619 2SC1684
Q620 2SC1684
Q621 2SC1317
Q622 2SC2497
Q623 2SA719
Q624 2SC1684
Q625 2SC1847V
Q626 2SC1684
Q627 2SC1684
Q628 2SC1684
Q629 2SC1318
Q630 2SC1684
Q631 2SC1684
Q632 2SC644
Q633 2SC1684
Q634 2SC1684
Q635 2SD389
Q641 2SC644
D618 RD62EB
D629 RD62EB
D620 10E1
D624 10E1
D626 10E1
D637 10E1
D638 10E1
D625 IS954
D640 VD1222

P61	
1	POWER TR E
2	POWER TR C
3	POWER TR B
4	GND
5	PAUSE REC Ⓛ

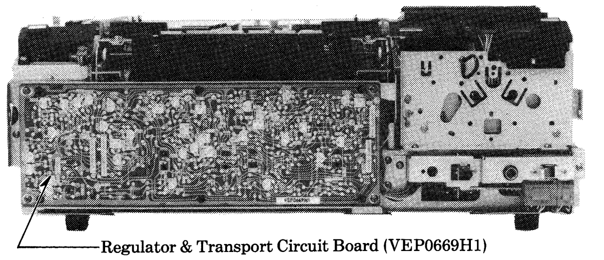
P62	
1	TIMER ON
2	TIMER SW ON
3	UNREG +19V
4	GND
5	GND
6	GND
7	POWER STOPPAGE
8	UNREG +18V
9	+12V
10	+12V

P63	
1	UNLOADING Ⓛ
2	UNLOADING Ⓛ
3	MOIST SENSOR
4	MOIST LED
5	FAN MOTOR SW
6	STOP SOL
7	LOADING M ⊕
8	LOADING M ⊖
9	
10	SUPPLY PHOTO TR
11	REEL STOP Ⓗ
12	PAUSE RELEASE Ⓗ

UNLESS OTHERWISE SPECIFIED, ALL DIODES ARE MA150

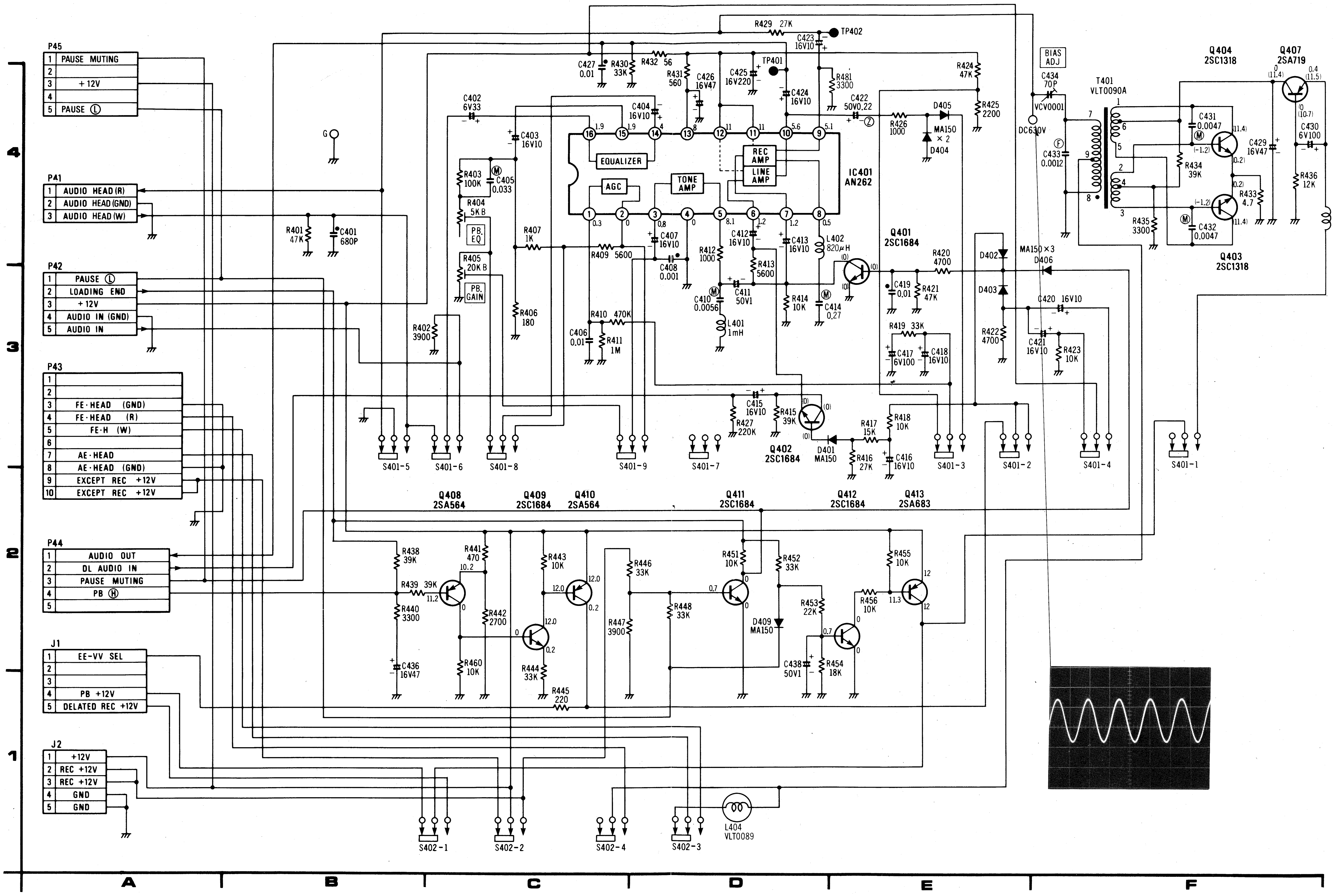
P64	
10	TAPE SLACK SW
9	PINCH SOL.
8	POWER LED ⊕
7	POWER LED ⊖
6	LAMP OUT
5	PAUSE (REMOTE)
4	TAKE UP PHOTO TR
3	LOADING END Ⓛ
2	LOADING END Ⓗ
1	LOADING END Ⓗ

P65	
10	MEMORY COUNTER
9	REEL STOP SENSOR
8	PAUSE Ⓛ
7	REEL STOP SENSOR
6	GND
5	
4	PB Ⓗ
3	CAPSTAN M ON
2	CYL LOCK
1	UNREG +19V



Regulator & Transport Circuit Board (VEP0669H1)

AUDIO SCHEMATIC DIAGRAM


P45
1 PAUSE MUTING
2
3 +12V
4
5 PAUSE Ⓛ
P41
1 AUDIO HEAD (R)
2 AUDIO HEAD (GND)
3 AUDIO HEAD (W)
P42
1 PAUSE Ⓛ
2 LOADING END
3 +12V
4 AUDIO IN (GND)
5 AUDIO IN
P43
1
2
3 FE·HEAD (GND)
4 FE·HEAD (R)
5 FE·H (W)
6
7 AE·HEAD
8 AE·HEAD (GND)
9 EXCEPT REC +12V
10 EXCEPT REC +12V
P44
1 AUDIO OUT
2 DL AUDIO IN
3 PAUSE MUTING
4 PB Ⓗ
5
J1
1 EE-VV SEL
2
3
4 PB +12V
5 DELATED REC +12V
J2
1 +12V
2 REC +12V
3 REC +12V
4 GND
5 GND
G
IC401
AN262
EQUALIZER
AGC
TONE AMP
REC AMP
LINE AMP
TP401
TP402
R429 27K
C423 16V10
C427 0.01
R430 33K
R432 56
R431 560
C426 16V47
C425 16V220
C424 16V10
R481 3300
R424 47K
R425 2200
C422 50V0.22
R426 1000
D405
MA150 ×2
D404
C402 6V33
C404 16V10
C403 16V10
R403 100K
C405 0.033
R404 5K B
PB. EQ
R405 20K B
PB. GAIN
R401 47K
C401 680P
R407 1K
R409 5600
C407 16V10
C408 0.001
R412 1000
C412 16V10
R413 5600
C413 16V10
L402 820μH
R406 180
R402 3900
R410 470K
C406 0.01
R411 1M
C410 0.0056
C411 50V1
L401 1mH
R414 10K
C414 0.27
Q401 2SC1684
R420 4700
C419 0.01
R421 47K
R419 33K
C417 6V100
C418 16V10
C415 16V10
R427 220K
R415 39K
Q402 2SC1684
D401 MA150
R417 15K
R418 10K
R416 27K
C416 16V10
S401-5
S401-6
S401-8
S401-9
S401-7
S401-3
S401-2
S401-4
S401-1
BIAS ADJ
C434 70P
VCV0001
DC630V
C433 0.0012
T401 VLT0090A
D402
D403
MA150×3
D406
C420 16V10
R422 4700
C421 16V10
R423 10K
Q404 2SC1318
Q407 2SA719
C431 0.0047
R434 39K
R435 3300
C432 0.0047
R433 4.7
C429 16V47
C430 6V100
R436 12K
L403 1mH
Q403 2SC1318
Q408 2SA564
Q409 2SC1684
Q410 2SA564
Q411 2SC1684
Q412 2SC1684
Q413 2SA683
R438 39K
R439 39K
R440 3300
C436 16V47
R441 470
R442 2700
R460 10K
R443 10K
R444 33K
R445 220
R446 33K
R447 3900
R448 33K
R451 10K
R452 33K
D409 MA150
R453 22K
C438 50V1
R454 18K
R455 10K
R456 10K
L404 VLT0089
S402-1
S402-2
S402-4
S402-3
A
B
C
D
E
F
1
2
3
4

P41 (Audio)		
PIN NO.	SIGNAL NAME	DESTINATION
1 2 3	Audio Head (R) Audio Head (Gnd) Audio Head (W)	(Audio/Control Head) (Audio/Control Head) (Audio/Control Head)

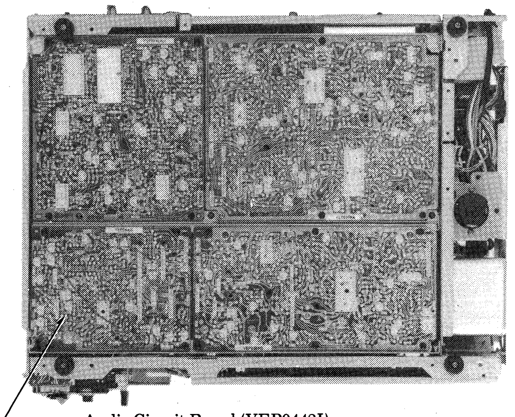
P42 (Audio)		
PIN NO.	SIGNAL NAME	DESTINATION
1	Pause (L)	P65-8 (Transport Circuit)
2	Loading End	P64-1 (Transport Circuit)
3	+12V	—
4	Audio In (Gnd)	P602-1 (Mic Jack Connection)
5	Audio In	P602-2 (Mic Jack Connection)

P43 (Audio)		
PIN NO.	SIGNAL NAME	DESTINATION
1	—	—
2	—	—
3	Fe. Head (Gnd)	(Full Erase Head)
4	Fe. Head (R)	(Full Erase Head)
5	Fe. Head (W)	(Full Erase Head)
6	—	—
7	Ae. Head	P612-5 (A/C Head Connection)
8	Ae. Head (Gnd)	P612-4 (A/C Head Connection)
9	Except Rec +12V	P32-2 (Luminance Process)
10	Except Rec +12V	P601-4 (Rear Jack Connection)

P44 (Audio)		
PIN NO.	SIGNAL NAME	DESTINATION
1	Audio Out	P601-2 (Rear Jack Connection)
2	D1 Audio Out	P604-1 (Input Selector)
3	—	—
4	P.B. (H)	P65-4 (Transport Circuit)
5	—	—

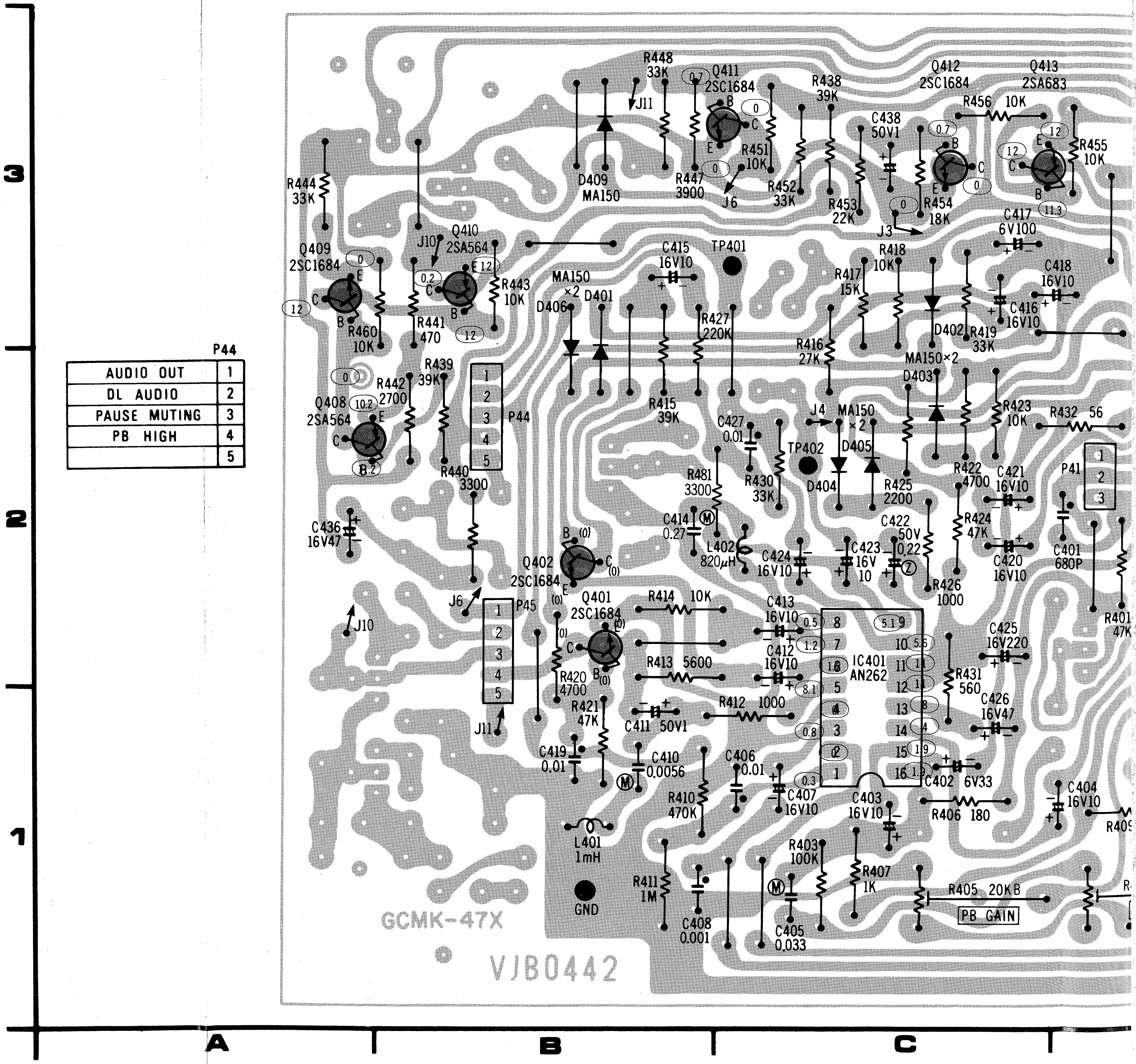
P45 (Audio)		
PIN NO.	SIGNAL NAME	DESTINATION
1	Pause Muting	P642-2 (Still Section)
2	—	—
3	+12V	P642-1 (Still Section)
4	—	—
5	Pause (L)	P642-3 (Still Section)

Audio Circuit Board	
Q401	B-2
Q402	B-2
Q403	E-1
Q404	E-1
Q407	D-1
Q408	A-2
Q409	A-3
Q410	B-3
Q411	C-3
Q412	C-3
Q413	C-3


Audio Circuit Board (VEP0442I)

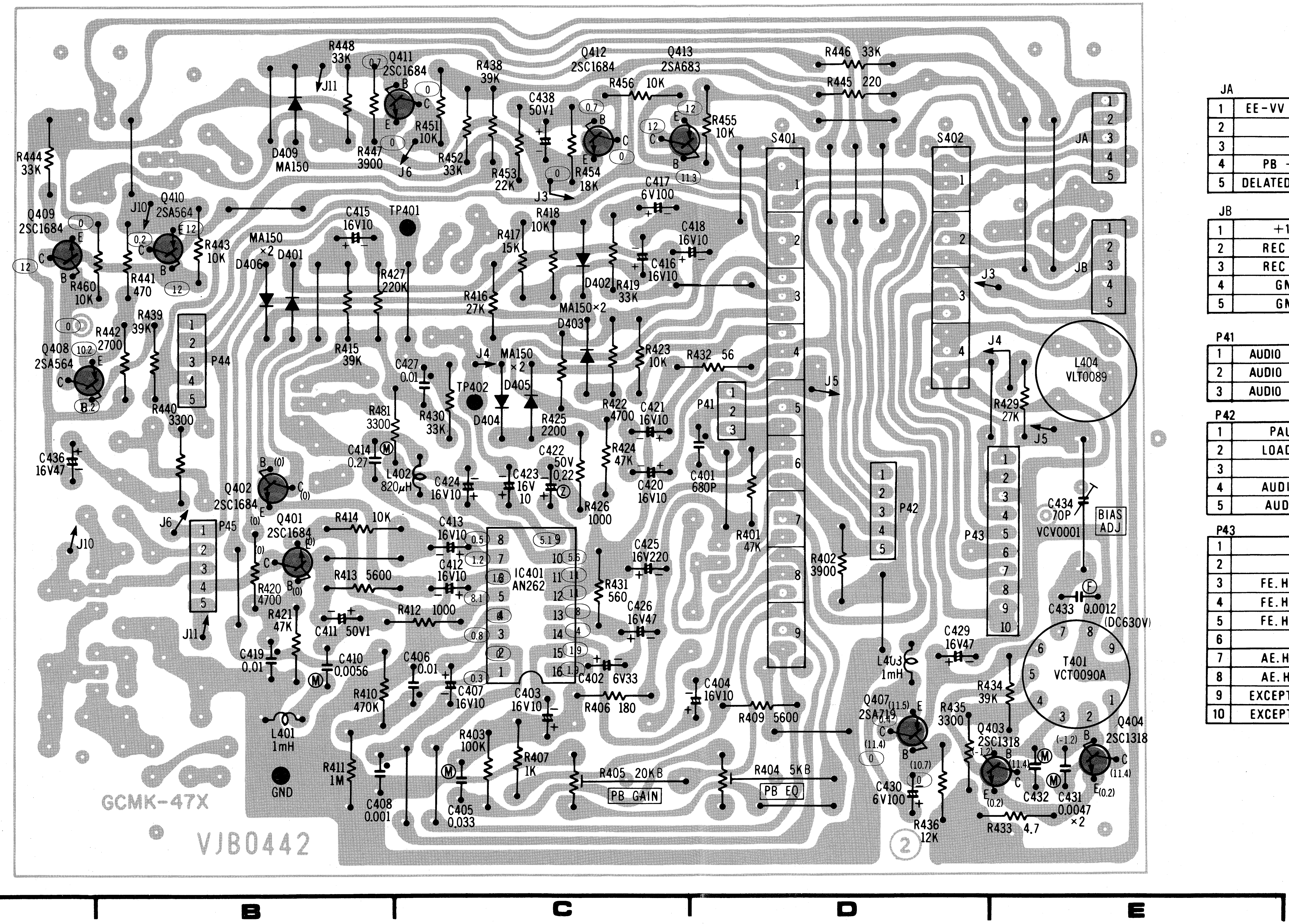
AUDIO CIRCUIT BOARD (VEP0442I)

P44	
AUDIO OUT	1
DL AUDIO	2
PAUSE MUTING	3
PB HIGH	4
	5



3
2
1
A
B
C
R448 33K
Q411 2SC1684
Q412 2SC1684
Q413 2SA683
R438 39K
R456 10K
C438 50V1
R455 10K
J11
D409 MA150
R447 3900
J6
R451 10K
R452 33K
R453 22K
R454 18K
J3
C417 6V100
R444 33K
Q409 2SC1684
J10
Q410 2SA564
R443 10K
MA150 ×2
D401
D406
C415 16V10
TP401
R418 10K
R417 15K
C418 16V10
C416 16V10
R460 10K
R441 470
R427 220K
R416 27K
D402
R419 33K
MA150×2
D403
R439 39K
R442 2700
Q408 2SA564
P44
R440 3300
R415 39K
C427 0.01
J4
MA150 ×2
D405
TP402
D404
R423 10K
R432 56
R422 4700
C421 16V10
P41
R481 3300
R430 33K
R425 2200
R424 47K
C436 16V47
C414 0.27
L402 820μH
C424 16V10
C423 16V 10
C422 50V 0.22
C420 16V10
C401 680P
Q402 2SC1684
R426 1000
J6
P45
Q401 2SC1684
R414 10K
C413 16V10
IC401 AN262
C425 16V220
R401 47K
J10
R413 5600
C412 16V10
R431 560
R420 4700
R421 47K
C411 50V1
R412 1000
C426 16V47
J11
C419 0.01
C410 0.0056
C406 0.01
C407 16V10
C403 16V10
C402 6V33
R406 180
C404 16V10
R410 470K
L401 1mH
R403 100K
R407 1K
R411 1M
GND
C408 0.001
C405 0.033
R405 20KB
PB GAIN
GCMK-47X
VJB0442

BOARD (VEP0442I)



Q411 2SC1684
Q412 2SC1684
Q413 2SA683
Q409 2SC1684
Q410 2SA564
Q408 2SA564
Q402 2SC1684
Q401 2SC1684
Q407 2SA719
Q403 2SC1318
Q404 2SC1318
D409 MA150
MA150 ×2
D401
D406
D402
D403
MA150×2
MA150 ×2
D404
D405
TP401
TP402
IC401 AN262
S401
S402
P41
P42
P43
P44
P45
JA
JB
J3
J4
J5
J6
J10
J11
L401 1mH
L402 820μH
L403 1mH
L404 VLT0089
T401 VCT0090A
C434 70P VCV0001
BIAS ADJ
C433 0.0012 (DC630V)
R405 20KB
PB GAIN
R404 5KB
PB EQ
GND
GCMK-47X
VJB0442
B
C
D
E

JA

1	EE-VV SELECT
2	
3	
4	PB +12V
5	DELATED REC +12V

JB

1	+12V
2	REC +12V
3	REC +12V
4	GND
5	GND

P41

1	AUDIO HEAD(R)
2	AUDIO HEAD(GND)
3	AUDIO HEAD(W)

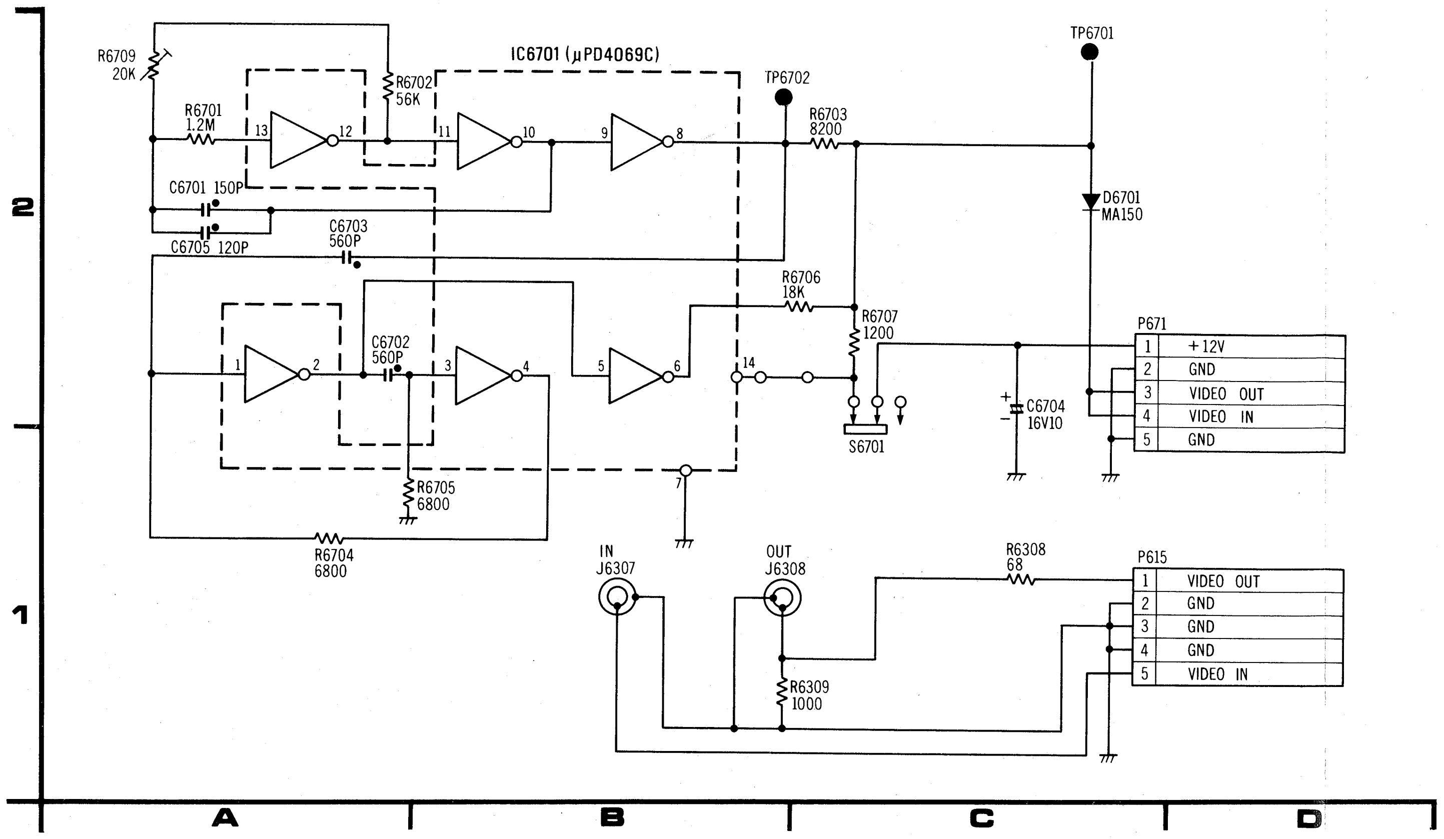
P42

1	PAUSE LOW
2	LOADING END
3	+12V
4	AUDIO IN (GND)
5	AUDIO IN

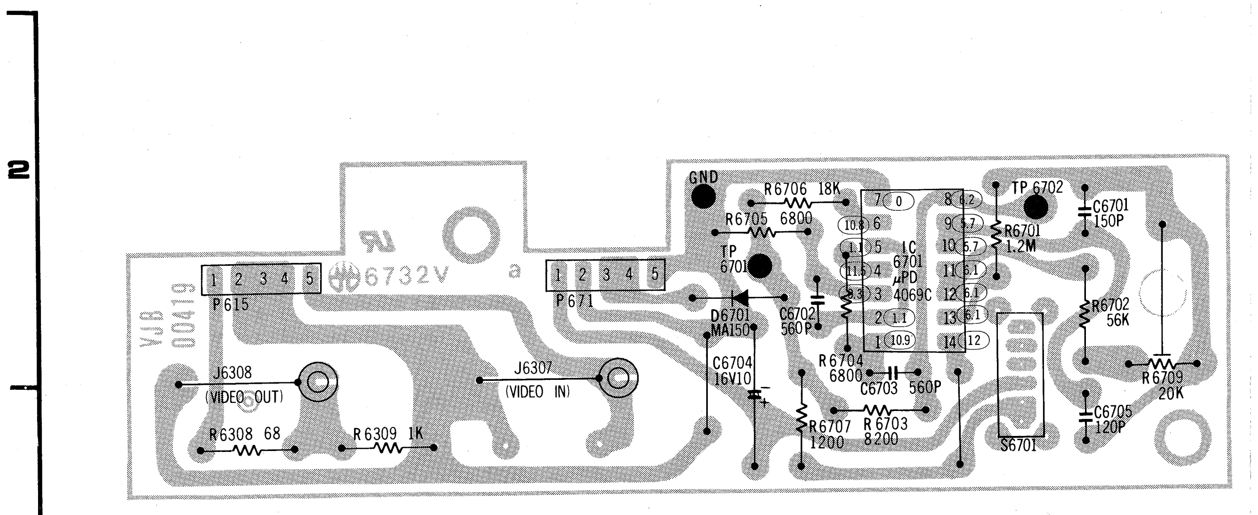
P43

1	
2	
3	FE. HEAD (GND)
4	FE. HEAD (R)
5	FE. HEAD (W)
6	
7	AE. HEAD
8	AE. HEAD (GND)
9	EXCEPT REC +12V
10	EXCEPT REC +12V

TEST SIGNAL / GENERATOR SCHEMATIC DIAGRAM (VEP00419A)


IC6701 (μPD4069C)
TP6701
TP6702
R6709 20K
R6701 1.2M
R6702 56K
R6703 8200
C6701 150P
C6705 120P
C6703 560P
C6702 560P
R6706 18K
R6707 1200
R6705 6800
R6704 6800
D6701 MA150
C6704 16V10
S6701
P671
1 +12V
2 GND
3 VIDEO OUT
4 VIDEO IN
5 GND
IN J6307
OUT J6308
R6308 68
R6309 1000
P615
1 VIDEO OUT
2 GND
3 GND
4 GND
5 VIDEO IN
1
2
A
B
C
D

TEST SIGNAL / GENERATOR CIRCUIT BOARD (VEP00419A)


VJB 00419
6732V
P615
P671
GND
TP 6702
TP 6701
R6706 18K
R6705 6800
IC 6701 μPD 4069C
R6701 1.2M
C6701 150P
D6701 MA150
C6702 560P
C6704 16V10
R6704 6800
C6703 560P
R6702 56K
R6709 20K
C6705 120P
R6707 1200
R6703 8200
S6701
J6308 (VIDEO OUT)
J6307 (VIDEO IN)
R6308 68
R6309 1K

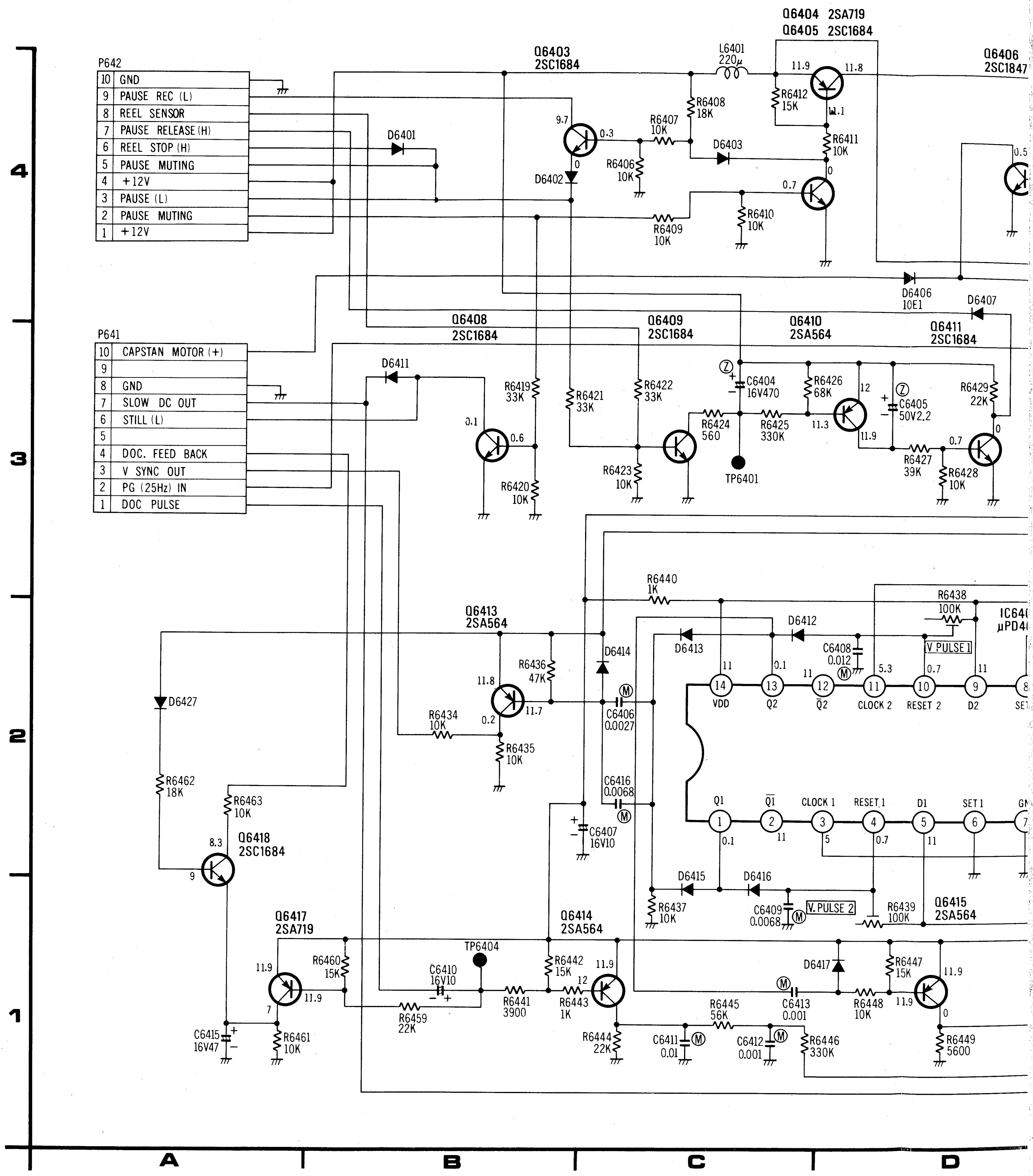
P615

1	VIDEO OUT
2	GND
3	GND (REMO)
4	GND
5	VIDEO IN

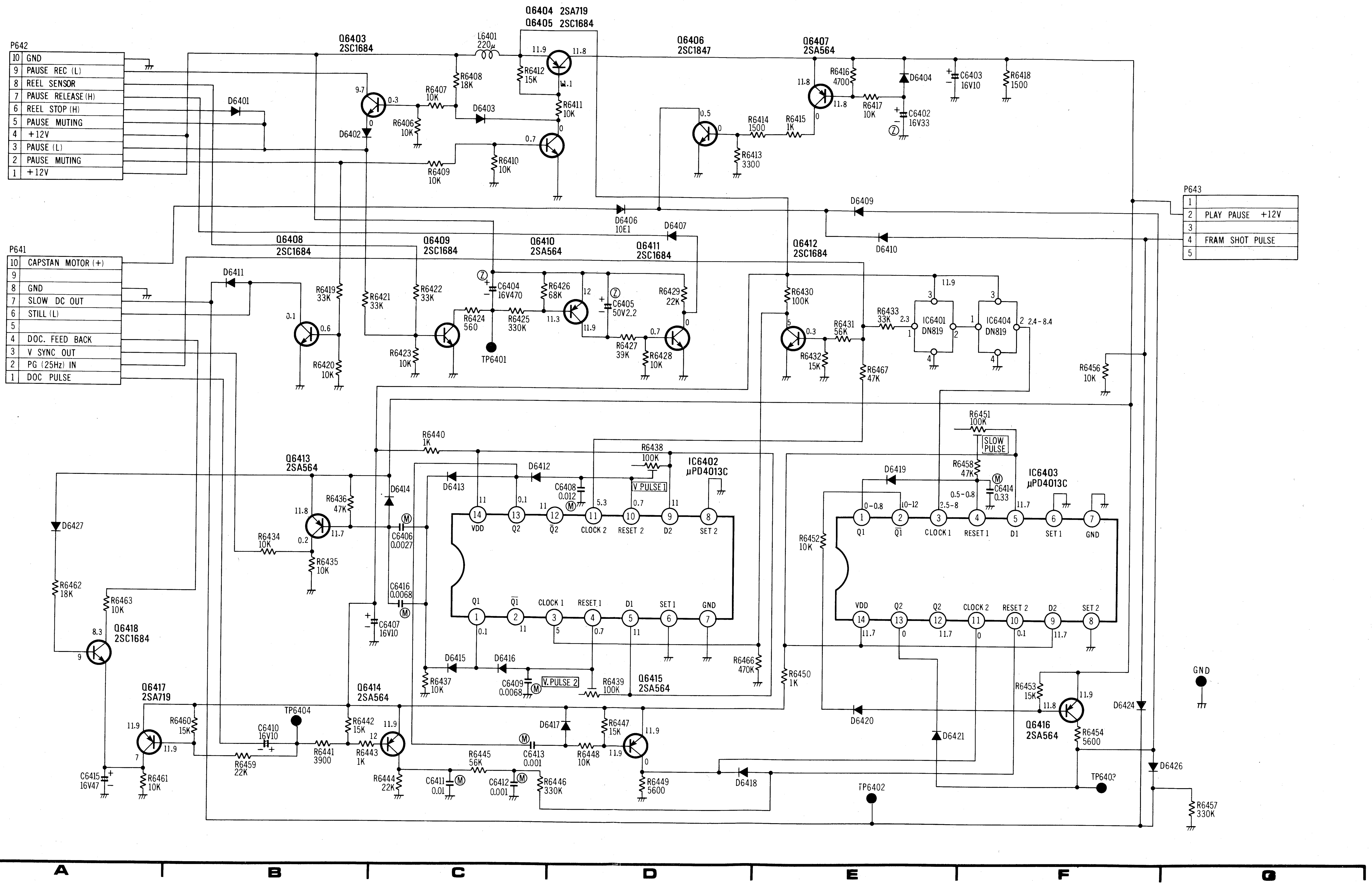
P671

1	+12V
2	GND
3	VIDEO OUT
4	VIDEO IN
5	GND

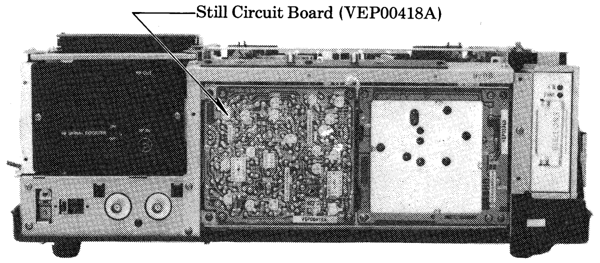
STILL CIRCUIT SCHEMATIC DIAGRAM


P642
10 GND
9 PAUSE REC (L)
8 REEL SENSOR
7 PAUSE RELEASE (H)
6 REEL STOP (H)
5 PAUSE MUTING
4 +12V
3 PAUSE (L)
2 PAUSE MUTING
1 +12V
P641
10 CAPSTAN MOTOR (+)
9
8 GND
7 SLOW DC OUT
6 STILL (L)
5
4 DOC. FEED BACK
3 V SYNC OUT
2 PG (25Hz) IN
1 DOC PULSE
Q6403 2SC1684
Q6404 2SA719
Q6405 2SC1684
Q6406 2SC1847
L6401 220μ
Q6408 2SC1684
Q6409 2SC1684
Q6410 2SA564
Q6411 2SC1684
Q6413 2SA564
Q6414 2SA564
Q6415 2SA564
Q6417 2SA719
Q6418 2SC1684
IC640 μPD4
TP6401
TP6404
V.PULSE 1
V.PULSE 2
VDD
CLOCK 2
RESET 2
CLOCK 1
RESET 1
1
2
3
4
A
B
C
D

STILL CIRCUIT SCHEMATIC DIAGRAM


P642
10 GND
9 PAUSE REC (L)
8 REEL SENSOR
7 PAUSE RELEASE (H)
6 REEL STOP (H)
5 PAUSE MUTING
4 +12V
3 PAUSE (L)
2 PAUSE MUTING
1 +12V
P641
10 CAPSTAN MOTOR (+)
9
8 GND
7 SLOW DC OUT
6 STILL (L)
5
4 DOC. FEED BACK
3 V SYNC OUT
2 PG (25Hz) IN
1 DOC PULSE
P643
1
2 PLAY PAUSE +12V
3
4 FRAM SHOT PULSE
5
Q6403 2SC1684
Q6404 2SA719
Q6405 2SC1684
Q6406 2SC1847
Q6407 2SA564
Q6408 2SC1684
Q6409 2SC1684
Q6410 2SA564
Q6411 2SC1684
Q6412 2SC1684
Q6413 2SA564
Q6414 2SA564
Q6415 2SA564
Q6416 2SA564
Q6417 2SA719
Q6418 2SC1684
L6401 220µ
IC6401 DN819
IC6404 DN819
IC6402 µPD4013C
IC6403 µPD4013C
VDD
Q1
Q̄1
CLOCK 1
RESET 1
D1
SET 1
GND
Q2
Q̄2
CLOCK 2
RESET 2
D2
SET 2
V PULSE 1
V PULSE 2
SLOW PULSE
D6401
D6402
D6403
D6404
D6406 10E1
D6407
D6409
D6410
D6411
D6412
D6413
D6414
D6415
D6416
D6417
D6418
D6419
D6420
D6421
D6424
D6426
D6427
R6406 10K
R6407 10K
R6408 18K
R6409 10K
R6410 10K
R6411 10K
R6412 15K
R6413 3300
R6414 1500
R6415 1K
R6416 4700
R6417 10K
R6418 1500
R6419 33K
R6420 10K
R6421 33K
R6422 33K
R6423 10K
R6424 560
R6425 330K
R6426 68K
R6427 39K
R6428 10K
R6429 22K
R6430 100K
R6431 56K
R6432 15K
R6433 33K
R6434 10K
R6435 10K
R6436 47K
R6437 10K
R6438 100K
R6439 100K
R6440 1K
R6441 3900
R6442 15K
R6443 1K
R6444 22K
R6445 56K
R6446 330K
R6447 15K
R6448 10K
R6449 5600
R6450 1K
R6451 100K
R6452 10K
R6453 15K
R6454 5600
R6456 10K
R6457 330K
R6458 47K
R6459 22K
R6460 15K
R6461 10K
R6462 18K
R6463 10K
R6466 470K
R6467 47K
C6402 16V33
C6403 16V10
C6404 16V470
C6405 50V2.2
C6406 0.0027
C6407 16V10
C6408 0.012
C6409 0.0068
C6410 16V10
C6411 0.01
C6412 0.001
C6413 0.001
C6414 0.33
C6415 16V47
C6416 0.0068
TP6401
TP6402
TP6403
TP6404
GND
A
B
C
D
E
F
G

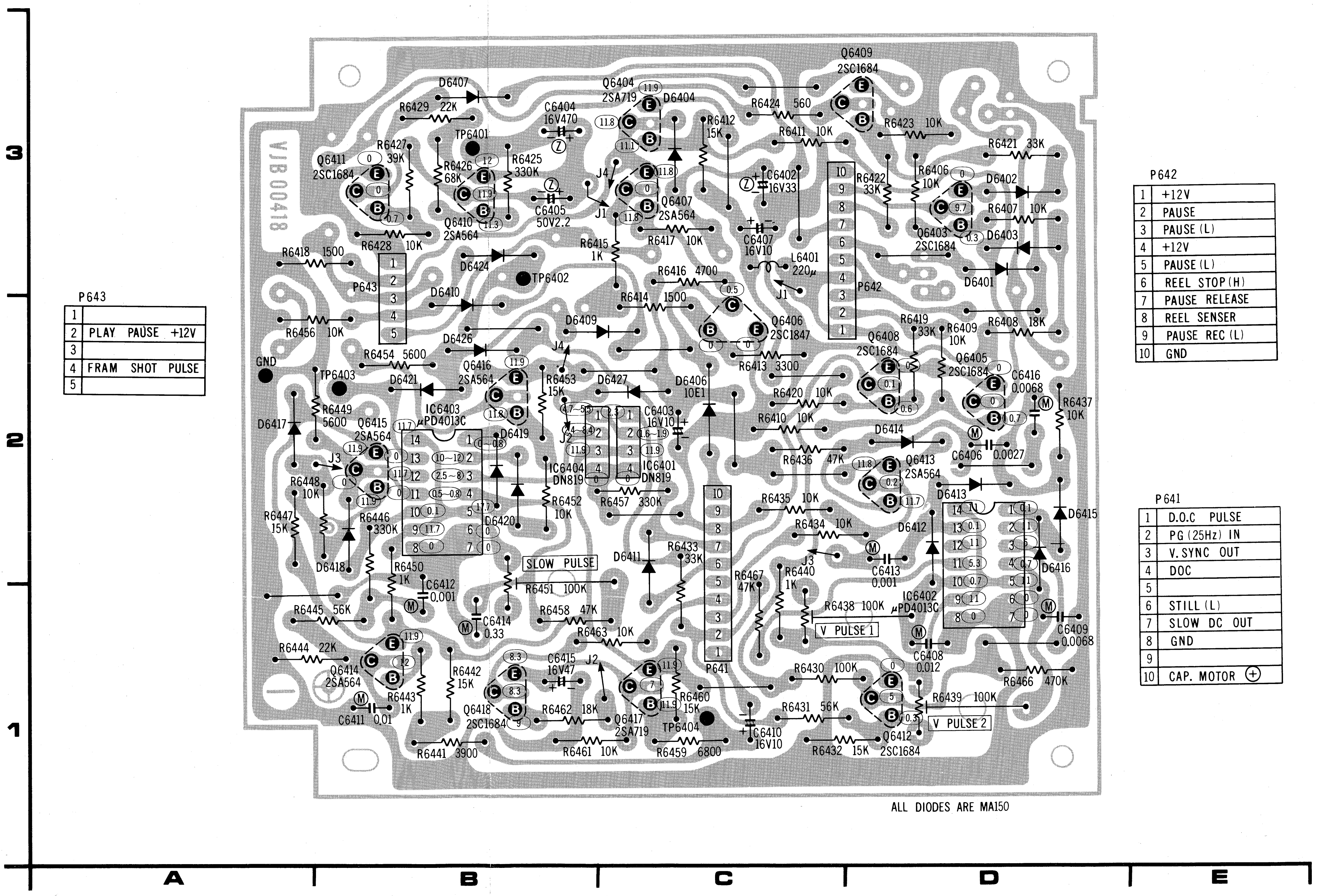
STILL CIRCUIT BOARD (VEP00418A)


Still Circuit Board (VEP00418A)

P641 (Still)		
PIN NO.	SIGNAL NAME	DESTINATION
1	DOC Pulse	P33-1 (Luminance Process)
2	PG (25 Hz) In	P32-4 (Luminance Process)
3	V. Sync. Out	P32-10 (Luminance Process)
4	DOC Feed Back	P31-3 (Luminance Process)
5	—	—
6	Still (L)	P25-5 (Servo Control)
7	Slow DC Out	P25-2 (Servo Control)
8	GND	P25-3 (Servo Control)
9	—	—
10	Cap Motor (+)	P25-4 (Servo Control)

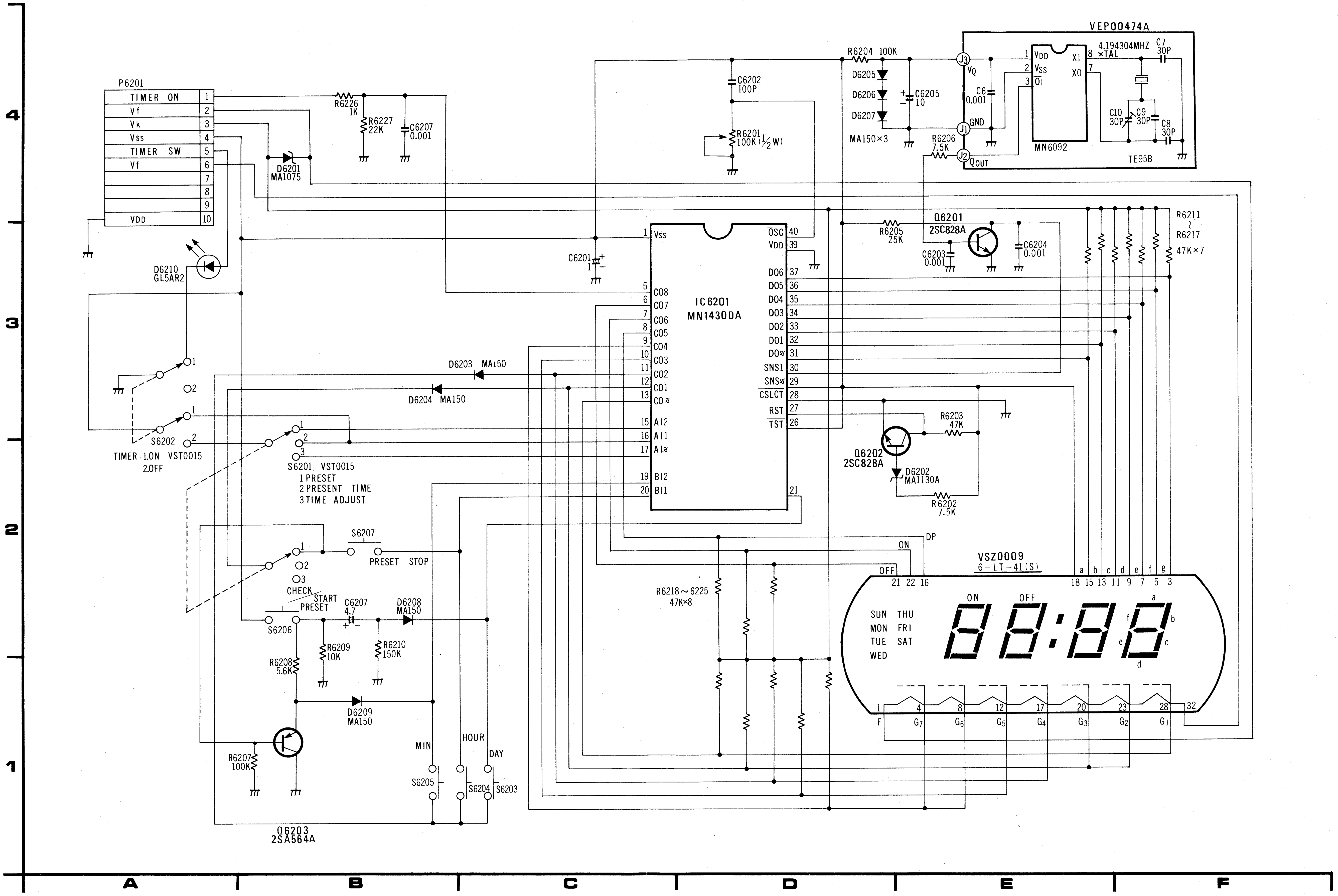
P642 (Still)		
PIN NO.	SIGNAL NAME	DESTINATION
1	+ 12V	P45-3 (Audio Section)
2	Pause Muting	P45-1 (Audio Section)
3	Pause (L)	P45-5 (Audio Section)
4	+ 12V	P671-1 (Test Sig. & Gen.)
5	Pause (L)	P33-3 (Luminance Process)
6	Reel Stop (H)	P63-11 (Transport Section)
7	Pause Release (H)	P63-12 (Transport Section)
8	Reel Sensor	P65-9 (Transport Section)
9	Pause Rec (L)	P61-5 (Transport Section)
10	GND	—

Still Circuit	
Q6403	D-3
Q6404	C-3
Q6405	D-2
Q6406	C-2
Q6407	C-3
Q6408	D-2
Q6409	D-3
Q6410	B-3
Q6411	B-3
Q6412	D-1
Q6413	D-2
Q6414	B-1
Q6415	B-2
Q6416	B-2
Q6417	C-1
Q6418	B-1

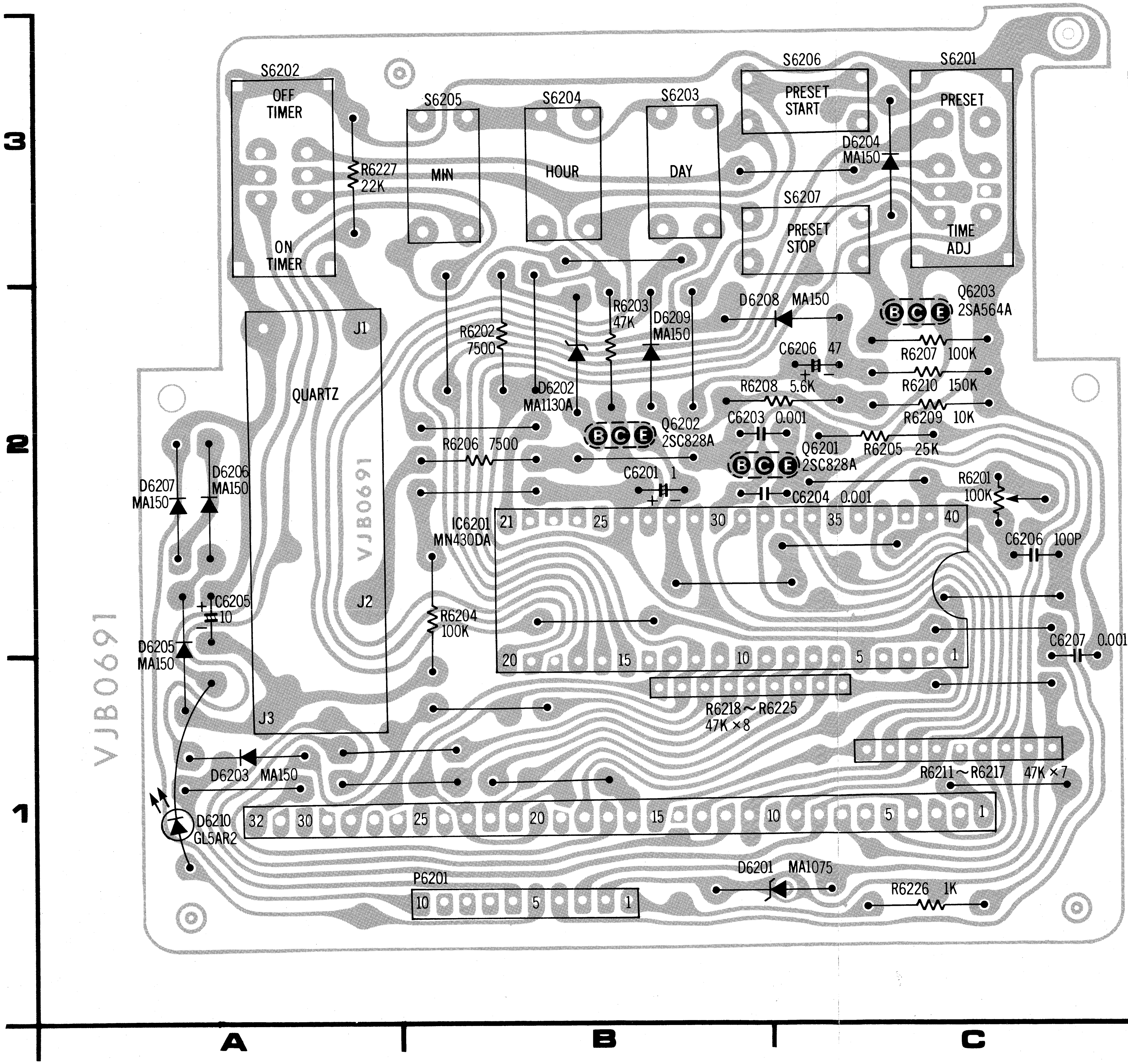

3
2
1
A
B
C
D
E
VJB 00418
P643
1
2 PLAY PAUSE +12V
3
4 FRAM SHOT PULSE
5
P642
1 +12V
2 PAUSE
3 PAUSE (L)
4 +12V
5 PAUSE (L)
6 REEL STOP (H)
7 PAUSE RELEASE
8 REEL SENSER
9 PAUSE REC (L)
10 GND
P641
1 D.O.C PULSE
2 PG (25Hz) IN
3 V. SYNC OUT
4 DOC
5
6 STILL (L)
7 SLOW DC OUT
8 GND
9
10 CAP. MOTOR ⊕
Q6409 2SC1684
Q6404 2SA719
D6404
D6407
R6429 22K
C6404 16V470
R6412 15K
R6424 560
R6411 10K
R6423 10K
R6421 33K
TP6401
R6427 39K
R6426 68K
R6425 330K
Q6411 2SC1684
Q6410 2SA564
Q6407 2SA564
C6405 50V2.2
C6402 16V33
R6422 33K
R6406 10K
D6402
R6407 10K
Q6403 2SC1684
D6403
R6418 1500
R6428 10K
R6415 1K
R6417 10K
C6407 16V10
L6401 220μ
D6401
D6424
TP6402
R6416 4700
D6410
R6414 1500
P642
R6456 10K
D6409
Q6406 2SC1847
R6419 33K
R6409 10K
R6408 18K
Q6408 2SC1684
D6426
R6413 3300
GND
TP6403
R6454 5600
Q6416 2SA564
R6453 15K
D6427
D6406 10E1
Q6405 2SC1684
C6416 0.0068
R6437 10K
D6421
IC6403 μPD4013C
C6403 16V10
R6420 10K
R6410 10K
D6417
R6449 5600
Q6415 2SA564
D6419
IC6404 DN819
IC6401 DN819
D6414
C6406 0.0027
R6436 47K
Q6413 2SA564
R6448 10K
R6452 10K
R6457 330K
D6413
R6435 10K
D6415
R6447 15K
R6446 330K
D6420
R6434 10K
D6412
D6418
R6450 1K
C6412 0.001
SLOW PULSE
D6411
R6433 33K
J3
D6416
R6451 100K
R6467 47K
R6440 1K
C6413 0.001
R6445 56K
C6414 0.33
R6458 47K
R6438 100K
IC6402 μPD4013C
V PULSE 1
R6463 10K
C6409 0.0068
R6444 22K
C6408 0.012
Q6414 2SA564
C6415 16V47
J2
R6442 15K
R6430 100K
R6466 470K
R6443 1K
Q6418 2SC1684
R6460 15K
R6439 100K
C6411 0.01
R6462 18K
Q6417 2SA719
R6431 56K
TP6404
C6410 16V10
V PULSE 2
Q6412 2SC1684
R6441 3900
R6461 10K
R6459 6800
R6432 15K
J1
J4
P641

ALL DIODES ARE MA150

TIMER UNIT SCHEMATIC DIAGRAM


P6201
TIMER ON 1
Vf 2
Vk 3
Vss 4
TIMER SW 5
Vf 6
7
8
9
VDD 10
R6226 1K
R6227 22K
C6207 0.001
D6201 MA1075
D6210 GL5AR2
S6202
TIMER 1.ON 2.OFF VST0015
S6201 VST0015
1 PRESET
2 PRESENT TIME
3 TIME ADJUST
D6203 MA150
D6204 MA150
S6207
PRESET STOP
CHECK
START
PRESET
S6206
C6207 4.7
D6208 MA150
R6209 10K
R6210 150K
R6208 5.6K
D6209 MA150
R6207 100K
Q6203 2SA564A
MIN
HOUR
DAY
S6205
S6204
S6203
C6202 100P
R6201 100K (1/2 W)
C6201 1
IC6201 MN1430DA
Vss
OSC
VDD
CO8
CO7
CO6
CO5
CO4
CO3
CO2
CO1
CO∅
AI2
AI1
AI∅
BI2
BI1
DO6
DO5
DO4
DO3
DO2
DO1
DO∅
SNS1
SNS∅
CSLCT
RST
TST
R6204 100K
D6205
D6206
D6207
MA150×3
C6205 10
R6206 7.5K
VEP00474A
J3 VQ
J1 GND
J2 QOUT
C6 0.001
VDD
VSS
Ō1
X1
X0
MN6092
4.194304MHZ ×TAL
C7 30P
C10 30P
C9 30P
C8 30P
TE95B
Q6201 2SC828A
R6205 25K
C6203 0.001
C6204 0.001
R6211 ~ R6217 47K×7
R6203 47K
Q6202 2SC828A
D6202 MA1130A
R6202 7.5K
R6218 ~ 6225 47K×8
DP
ON
OFF
VSZ0009
6-LT-41(S)
a b c d e f g
18 15 13 11 9 7 5 3
21 22 16
ON OFF
SUN THU
MON FRI
TUE SAT
WED
1 4 8 12 17 20 23 28 32
F G7 G6 G5 G4 G3 G2 G1
4
3
2
1
A
B
C
D
E
F

TIMER UNIT CIRCUIT BOARD (VEQ0177)

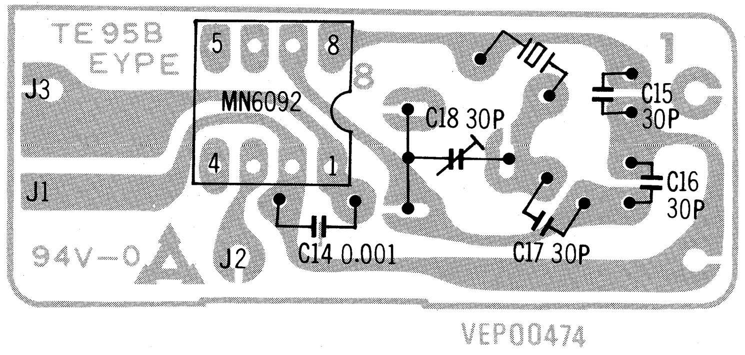

S6202
OFF TIMER
ON TIMER
R6227 22K
S6205
MIN
S6204
HOUR
S6203
DAY
S6206
PRESET START
S6207
PRESET STOP
S6201
PRESET
TIME ADJ
D6204 MA150
J1
QUARTZ
J2
J3
VJB0691
R6202 7500
R6203 47K
D6209 MA150
D6202 MA1130A
Q6202 2SC828A
D6208 MA150
Q6203 2SA564A
C6206 47
R6207 100K
R6210 150K
R6208 5.6K
R6209 10K
C6203 0.001
Q6201 2SC828A
R6205 25K
R6206 7500
C6201 1
C6204 0.001
R6201 100K
IC6201 MN430DA
21
25
30
35
40
C6206 100P
R6204 100K
20
15
10
5
1
C6207 0.001
R6218～R6225 47K×8
R6211～R6217 47K×7
D6207 MA150
D6206 MA150
C6205 10
D6205 MA150
D6203 MA150
D6210 GL5AR2
32
30
25
20
15
10
5
1
P6201
10
5
1
D6201 MA1075
R6226 1K
B C E
3
2
1
A
B
C

P6201

1	TIMER ON
2	Vf
3	Vk
4	Vss
5	TIMER SW
6	Vf
7	
8	
9	
10	VDD

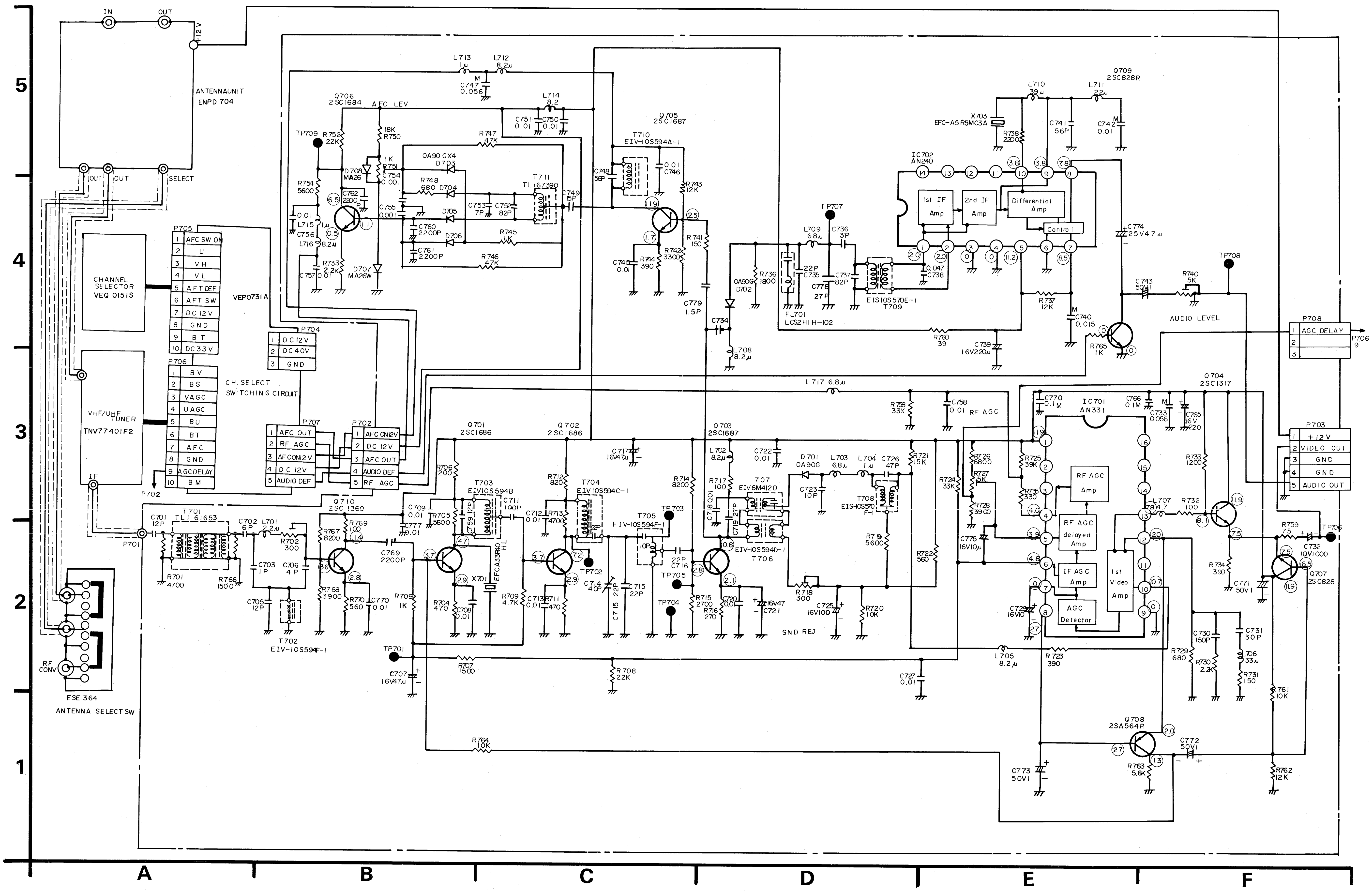
P6201 (Timer)		
PIN. NO	SIGNAL NAME	DISTINATION
1	Timer On	P62-1 (Timer)
2	Timer SW	P62-2 (Timer SW)
3	AC 3V	P12-3 (Power Supply)
4	GND	P11-10 (Power Supply)
5	AC 3V	P12-5 (Power Supply)
6	−15V	P12-1 (Power Supply)
7	+15V	P12-2 (Power Supply)
8	—	—
9	—	—
10	—	—

TIMER SUB CIRCUIT BOARD (VEP00474A)


TE95B
EYPE
J3
J1
J2
MN6092
5
8
4
1
C18 30P
C15 30P
C16 30P
C17 30P
C14 0.001
94V-0
VEP00474

NV-8610-E

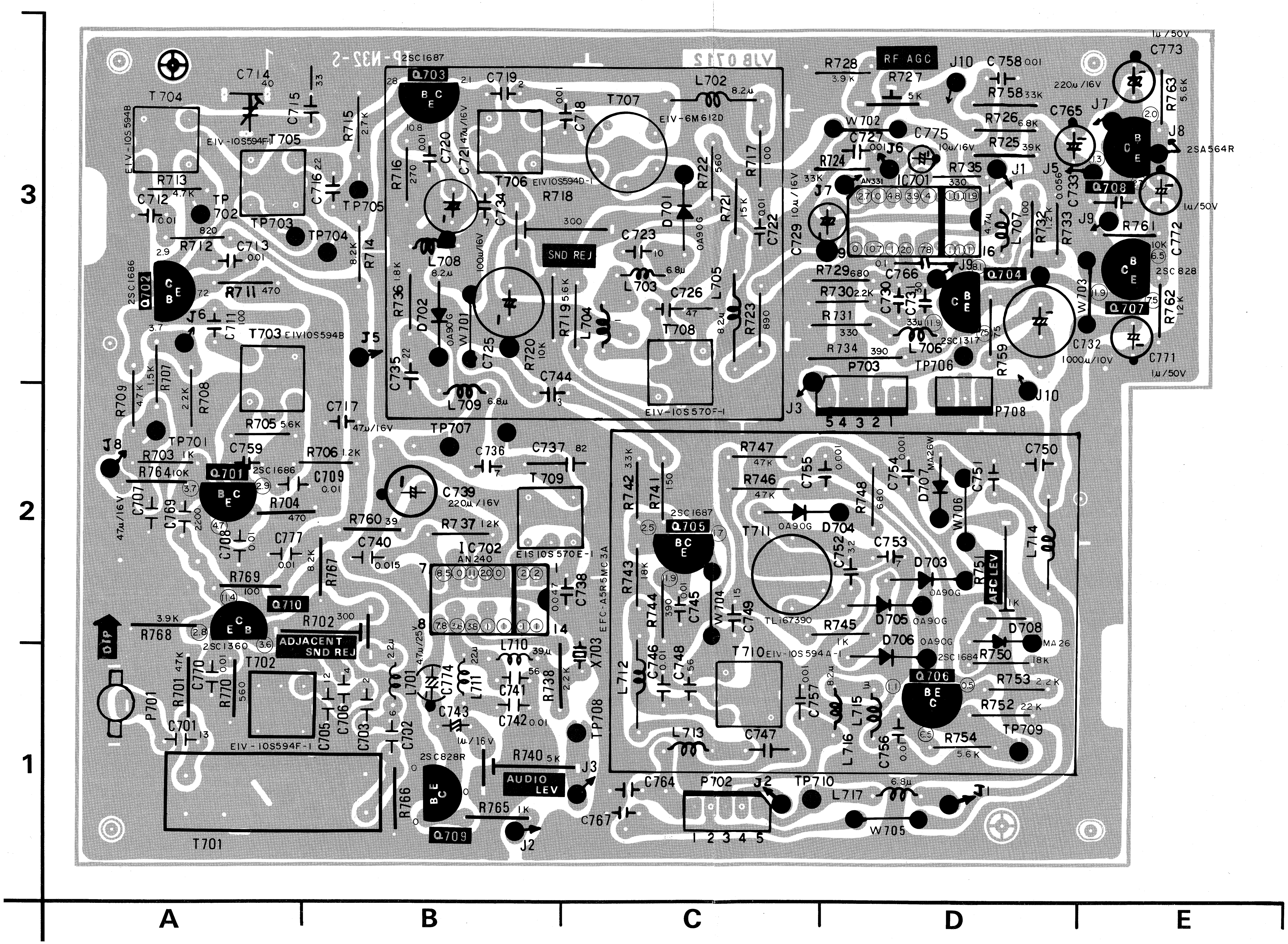
TV DEMODULATOR SCHEMATIC DIAGRAM



IN
OUT
12V
ANTENNAUNIT
ENPD 704
OUT
OUT
SELECT
CHANNEL SELECTOR
VEQ 0151S
P705
1 AFC SW ON
2 U
3 VH
4 VL
5 AFT DEF
6 AFT SW
7 DC 12V
8 GND
9 BT
10 DC 33V
VEP0731A
P704
1 DC 12V
2 DC 40V
3 GND
VHF/UHF TUNER
TNV77401F2
P706
1 BV
2 BS
3 VAGC
4 UAGC
5 BU
6 BT
7 AFC
8 GND
9 AGC DELAY
10 BM
CH. SELECT SWITCHING CIRCUIT
P707
1 AFC OUT
2 RF AGC
3 AFC ON 12V
4 DC 12V
5 AUDIO DEF
P702
1 AFC ON 12V
2 DC 12V
3 AFC OUT
4 AUDIO DEF
5 RF AGC
IF
P702
P701
ESE 364
ANTENNA SELECT SW
RF CONV
T701 TLI 61653
T702 EIV-10S594F-1
Q710 2SC1360
Q701 2SC1686
Q702 2SC1686
Q703 2SC1687
Q704 2SC1317
Q705 2SC1687
Q706 2SC1684
Q707 2SC828
Q708 2SA564P
Q709 2SC828R
T703 EIV10S594B
T704 EIV10S594C-1
T705 FIV-10S594F-1
T706 EIV-10S594D-1
707 EIV6M412D
T708 EIS-10S570F-1
T709 EIS10S570E-1
T710 EIV-10S594A-1
T711 TL167390
X701 EFCA33R0HL
X703 EFC-A5R5MC3A
FL701 LCS2H1H-102
IC701 AN331
IC702 AN240
1st IF Amp
2nd IF Amp
Differential Amp
Control
RF AGC Amp
RF AGC delayed Amp
IF AGC Amp
AGC Detector
1st Video Amp
AFC LEV
AUDIO LEVEL
RF AGC
SND REJ
TP701
TP702
TP703
TP704
TP705
TP706
TP707
TP708
TP709
P708
1 AGC DELAY
P706 9
P703
1 +12V
2 VIDEO OUT
3 GND
4 GND
5 AUDIO OUT
A
B
C
D
E
F
1
2
3
4
5

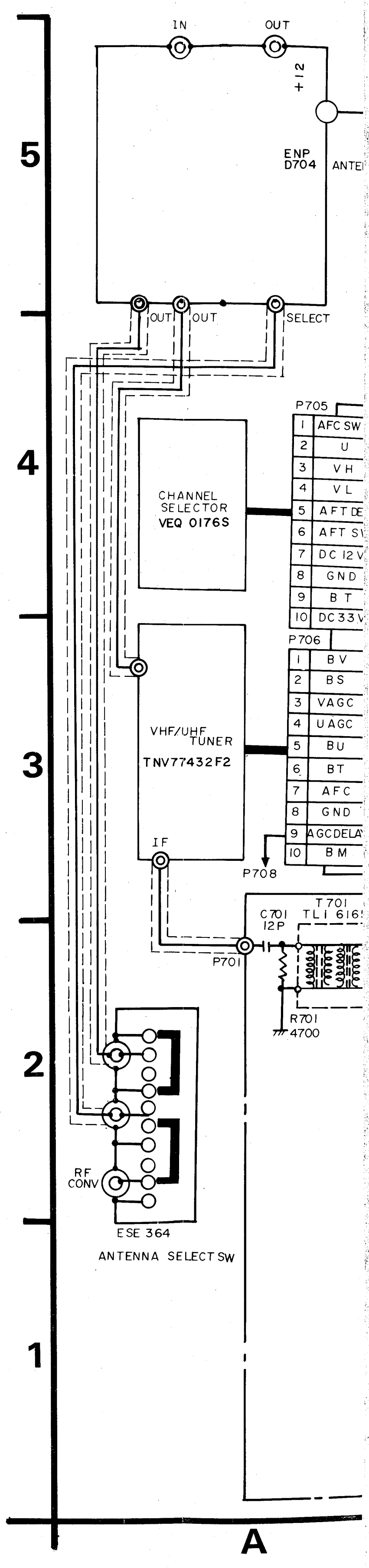
NV-8610-E/-EO

TV DEMODULATOR CIRCUIT BOARD


3
2
1
A
B
C
D
E
T704
EIV-10S594B
C714 40
C715 33
T705
EIV-10S594F-1
R713 4.7K
C712 0.01
TP702
TP703
C716 22
TP705
TP704
R715 2.7K
R714 8.2K
R712 820
C713 0.01
Q702 2SC1686
R711 470
J6
C711 100
T703 EIV10S594B
J5
R709 4.7K
R707 1.5K
R708 2.2K
R705 5.6K
C717 47µ/16V
J8
TP701
R703 1K
R764 10K
Q701 2SC1686
C759
R706 1.2K
C709 0.01
R704 470
C707 47µ/16V
C769 2200
C708 0.01
C777 0.01
R769 100
R767
R768 3.9K
Q710 2SC1360
R702 300
ADJACENT SND REJ
DIP
P701
R701 4.7K
C770 0.01
R770 560
T702
C701 13
C705
C706
C703
C702
L701 2.2µ
EIV-10S594F-1
T701
Q703 2SC1687
C719 2
C718 0.01
T707
L702 8.2µ
EIV-6M612D
R716 270
C720 0.01
C721 47µ/16V
T706 EIV10S594D-1
R718 300
C734
L708 8.2µ
SND REJ
R736 1.8K
D702 0A90G
W701
C725
R720 10K
R719 5.6K
L704
C735 22
L709 6.8µ
C744 3
D701 0A90G
R722 560
R721 1.5K
R717 100
C722 0.01
C723 10
L703 6.8µ
C726 47
T708
L705 8.2µ
R723 890
EIV-10S570F-1
TP707
C736 7
C737 82
C739 220µ/16V
T709
R760 39
R737 1.2K
C740 0.015
IC702 AN240
EIS10S570E-1
C738 0.047
EFC-A5R5MC3A
X703
C774 47µ/25V
L711 22µ
L710 39µ
C741 56
C743
C742 0.01
R738 2.2K
TP708
Q709 2SC828R
R740 5K
AUDIO LEV
J3
R766
R765 1K
J2
RF AGC
R728 3.9K
R727 5K
J10
C758 0.01
R758 33K
R726 6.8K
W702
C727 0.01
C775 10µ/16V
R725 39K
R724 33K
IC701 AN331
R735 330
J1
J7
C729 10µ/16V
R729 680
R730 2.2K
R731 330
R734 390
C766
C730
C731 33µ
L706
Q704 2SC1317
P703
5 4 3 2 1
TP706
P708
R759
C732 1000µ/10V
W703
Q707 2SC828
R762 12K
C771 1µ/50V
C773 1µ/50V
C772 220µ/16V
R763 5.6K
C765
J8
2SA564R
Q708
C733 0.056
L707 4.7µ
R732 1.2K
R733
J9
R761 10K
R747 47K
R746 47K
C755 0.001
C754 0.001
D707 MA26W
C751
C750
W706
L714
R742 3.3K
R741 150
Q705 2SC1687
R748 680
D704 0A90G
T711
R743 18K
R744 390
C745 0.01
W704
C749 15
TL167390
C752 3.2
C753 7
D703 0A90G
R751 1K
AFC LEV
R745 1K
D705 0A90G
D708 MA26
D706 0A90G
R750 18K
L712
C746 0.01
C748 56
T710 EIV-10S594A-1
C757 0.01
L716 8.2µ
L715 1µ
Q706 2SC1684
R753 2.2K
R752 22K
C756 0.01
R754 5.6K
TP709
L713
C747
C764
C767
P702
1 2 3 4 5
J2
TP710
L717 6.8µ
J1
W705
VJB0712
TP-N32-S

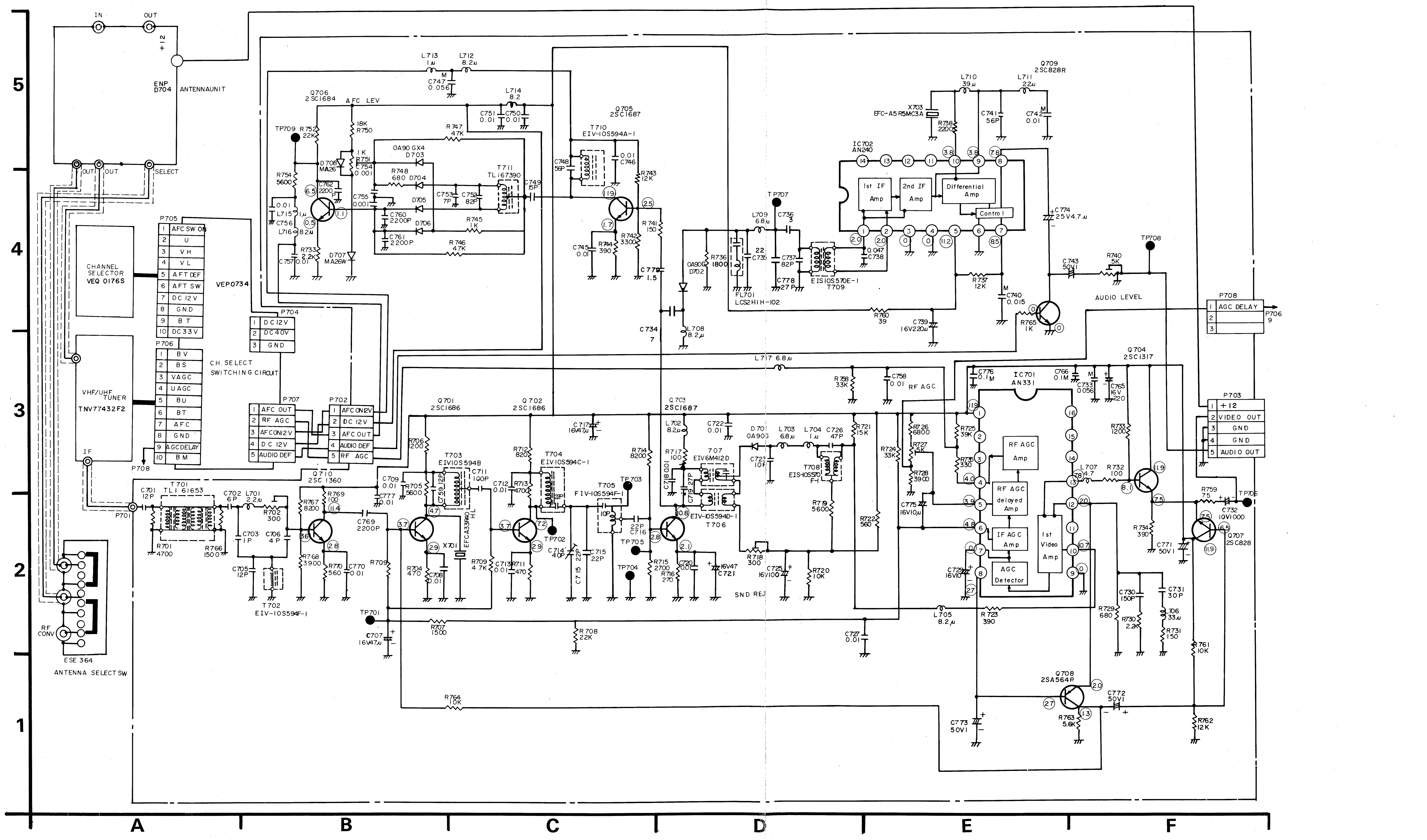
NV-8610-EO

TV DEMODULAT


5
4
3
2
1
A
IN
OUT
+12
ENP D704
ANTE
OUT
OUT
SELECT
P705
1 AFC SW
2 U
3 VH
4 VL
5 AFT DE
6 AFT S
7 DC 12V
8 GND
9 BT
10 DC 33V
CHANNEL SELECTOR VEQ 0176S
P706
1 BV
2 BS
3 VAGC
4 UAGC
5 BU
6 BT
7 AFC
8 GND
9 AGCDELA
10 BM
VHF/UHF TUNER TNV77432F2
IF
P708
C701 12P
T701 TLI 616
P701
R701 4700
RF CONV
ESE 364
ANTENNA SELECT SW

NV-8610-EO

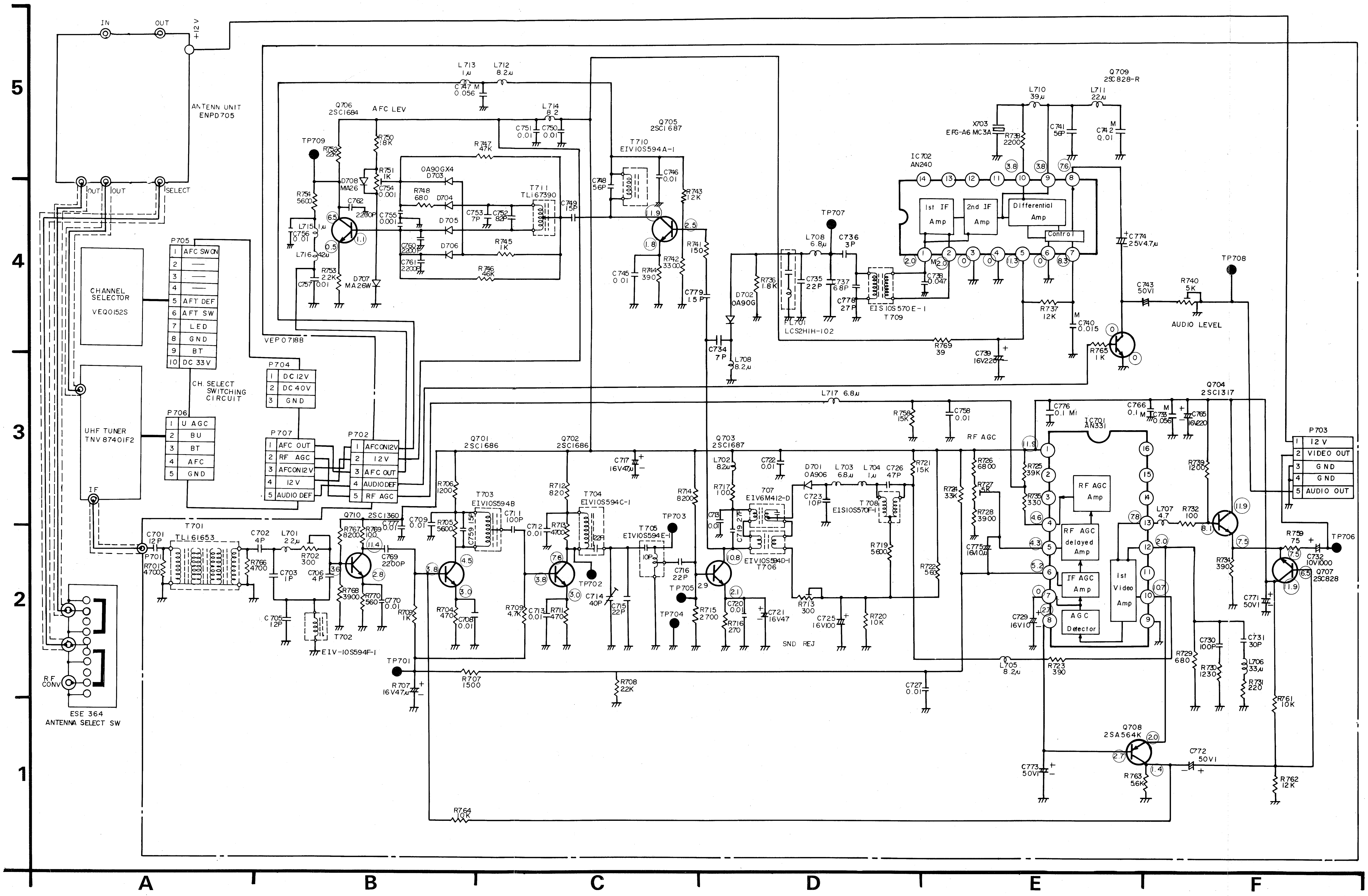
TV DEMODULATOR SCHEMATIC DIAGRAM



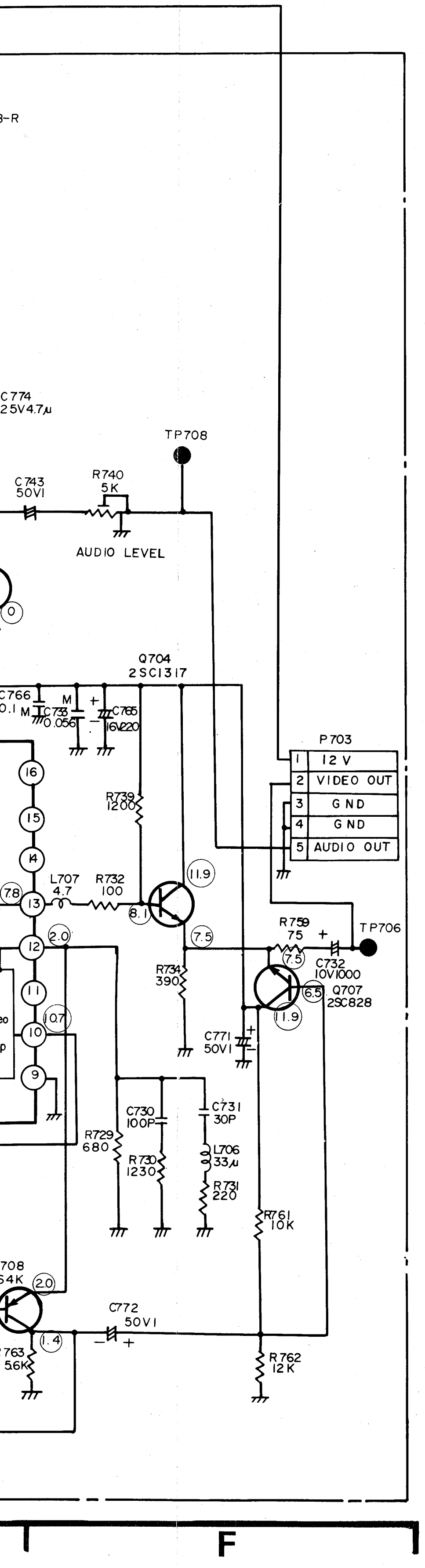
IN
OUT
+12
ENP D704 ANTENNAUNIT
OUT
OUT
SELECT
CHANNEL SELECTOR VEQ 0176S
VHF/UHF TUNER TNV77432F2
IF
RF CONV
ESE 364
ANTENNA SELECT SW
P705
AFC SW ON
U
VH
VL
AFT DEF
AFT SW
DC 12V
GND
BT
DC 33V
VEP0734
P706
BV
BS
VAGC
UAGC
BU
BT
AFC
GND
AGC DELAY
BM
P708
CH. SELECT SWITCHING CIRCUIT
P704
DC 12V
DC 40V
GND
P707
AFC OUT
RF AGC
AFC ON 12V
DC 12V
AUDIO DEF
P702
AFC ON 12V
DC 12V
AFC OUT
AUDIO DEF
RF AGC
P701
T701 TLI 61653
T702 EIV-10S594F-1
Q710 2SC1360
Q701 2SC1686
Q702 2SC1686
Q703 2SC1687
Q705 2SC1687
Q706 2SC1684
AFC LEV
T703 EIV10S594B
T704 EIV10S594C-1
T705 FIV-10S594F-1
T706 EIV-10S594D-1
707 EIV6M412D
T708 EIS10S570 F-1
T709 EIS10S570E-1
T710 EIV-10S594A-1
T711 TL167390
X701 EFCA33R40HL
D703 0A90 GX4
D708 MA26
D707 MA26W
D702 0A90G
D701 0A90G
FL701 LCS2H1H-102
IC702 AN240
1st IF Amp
2nd IF Amp
Differential Amp
Control
X703 EFC-A5R5MC3A
Q709 2SC828R
AUDIO LEVEL
SND REJ
IC701 AN331
RF AGC Amp
RF AGC delayed Amp
IF AGC Amp
AGC Detector
1st Video Amp
Q704 2SC1317
Q707 2SC828
Q708 2SA564P
P708
AGC DELAY
P706 9
P703
+12
VIDEO OUT
GND
GND
AUDIO OUT
TP701
TP702
TP703
TP704
TP705
TP706
TP707
TP708
TP709
1
2
3
4
5
A
B
C
D
E
F

NV-8610-B

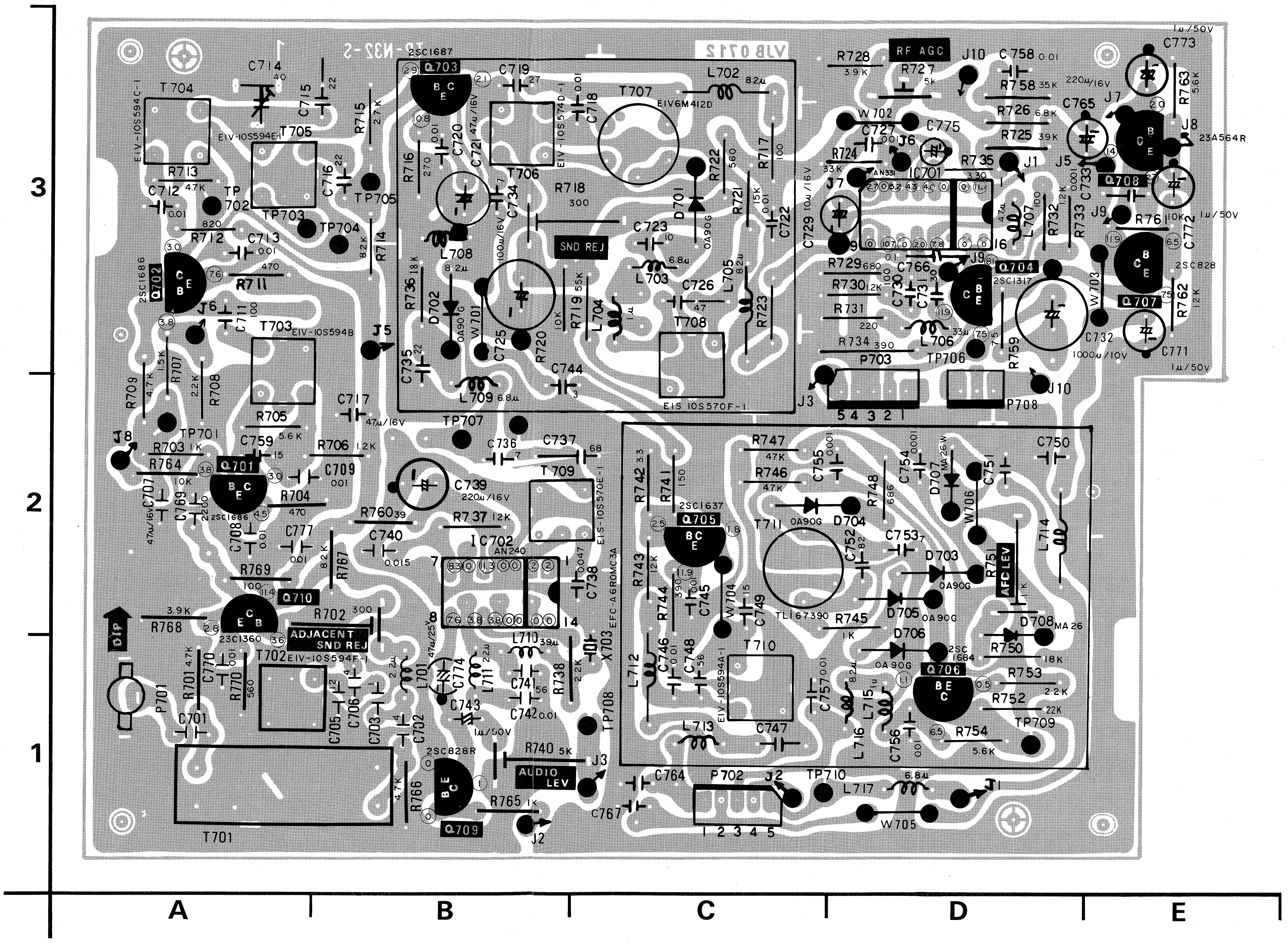
TV DEMODULATOR SCHEMATIC DIAGRAM



5
4
3
2
1
A
B
C
D
E
F
IN
OUT
+12V
ANTENN UNIT
ENPD705
OUT
OUT
SELECT
CHANNEL SELECTOR
VEQ0152S
P705
1 AFC SWON
5 AFT DEF
6 AFT SW
7 LED
8 GND
9 BT
10 DC 33V
VEP0718B
P704
1 DC12V
2 DC40V
3 GND
CH. SELECT SWITCHING CIRCUIT
P706
1 U AGC
2 BU
3 BT
4 AFC
5 GND
UHF TUNER
TNV 87401F2
IF
P707
1 AFC OUT
2 RF AGC
3 AFCON12V
4 12V
5 AUDIO DEF
P702
1 AFCON12V
2 12V
3 AFC OUT
4 AUDIODEF
5 RF AGC
ESE 364
ANTENNA SELECT SW
RF CONV
Q706
2SC1684
AFC LEV
TP709
L713 1μ
L712 8.2μ
C747 M 0.056
L714 8.2
C751 0.01
C750 0.01
R747 47K
OA90GX4
D703
D704
D705
D706
D708 MA26
D707 MA26W
R748 680
R751 1K
R750 18K
C754 0.001
C755 0.001
C753 7P
C752 82P
R745 1K
R746 46K
T711
TL167390
C749 15P
C760 2200P
C761 2200P
C762 2200P
R754 5600
L715 1μ
C756 0.01
L716 0.42μ
R753 2.2K
C757 0.01
Q705
2SC1687
T710
EIV10S594A-1
C748 56P
C746 0.01
R743 12K
R741 150
C745 0.01
R744 390
R742 3300
C779 15P
TP707
L708 6.8μ
C736 3P
C735 22P
C737 68P
C778 27P
R736 1.8K
D702 OA90G
L701
LCS2HIH-102
E1S10S570E-1
T709
C738 0.047
C734 7P
L708 8.2μ
R769 39
C739 16V22
IC702
AN240
1st IF Amp
2nd IF Amp
Differential Amp
Control
X703
EFG-A6 MC3A
R738 2200
L710 39μ
L711 22μ
C741 56P
C742 M 0.01
Q709
2SC828-R
C774 25V4.7μ
R737 12K
C740 M 0.015
R765 1K
C743 50V1
R740 5K
AUDIO LEVEL
TP708
L717 6.8μ
R758 15K
C758 0.01
RF AGC
C776 0.1 M
C766 0.1 M
C733 M 0.056
C765 16V220
IC701
AN331
Q704
2SC1317
RF AGC Amp
RF AGC delayed Amp
IF AGC Amp
AGC Detector
1st Video Amp
P703
1 12V
2 VIDEO OUT
3 GND
4 GND
5 AUDIO OUT
R739 1200
L707 4.7
R732 100
R734 390
R759 75
C732 10V1000
Q707 2SC828
TP706
C771 50V1
Q701 2SC1686
Q702 2SC1686
Q703 2SC1687
Q710 2SC1360
C701 12P
T701
TL161653
P701
R701 4700
C702 4P
L701 2.2μ
R702 300
R766 4700
C703 1P
C706 4P
C705 12P
R767 8200
R769 100
C769 2200P
R768 3900
R770 560
C770 0.01
T702
E1V-10S594F-1
C777 0.01
C709 0.01
R706 1200
R705 5600
T703
EIV10S594B
C759 15P
C711 100P
R704 470
C708 0.01
R709 4.7K
R703 1K
TP701
R707 1500
R707 16V47μ
R764 10K
C712 0.01
R712 820
R713 4700
T704
EIV10S594C-1
C717 16V47μ
TP702
C713 0.01
R711 470
C714 40P
C715 22P
T705
EIV10S594E-1
10P
TP703
C716 22P
TP705
TP704
R708 22K
R714 8200
L702 8.2μ
R717 100
C722 0.01
C718 0.01
C719 27P
707
EIV6M412-D
EIV10S594D-1
T706
R715 2700
C720 0.01
R716 270
C721 16V47
D701 OA906
L703 6.8μ
L704 1μ
C726 47P
C723 10P
T708
E1S10S570F-1
R719 5600
R713 300
C725 16V100
R720 10K
SND REJ
R721 15K
R722 560
R724 33K
R726 6800
R727 5K
R728 3900
C775 16V10
C727 0.01
R725 39K
R735 330
C729 16V10
L705 8.2μ
R723 390
C730 100P
C731 30P
R729 680
R730 1230
L706 33μ
R731 220
R761 10K
Q708
2SA564K
C773 50V1
R763 5.6K
C772 50V1
R762 12K

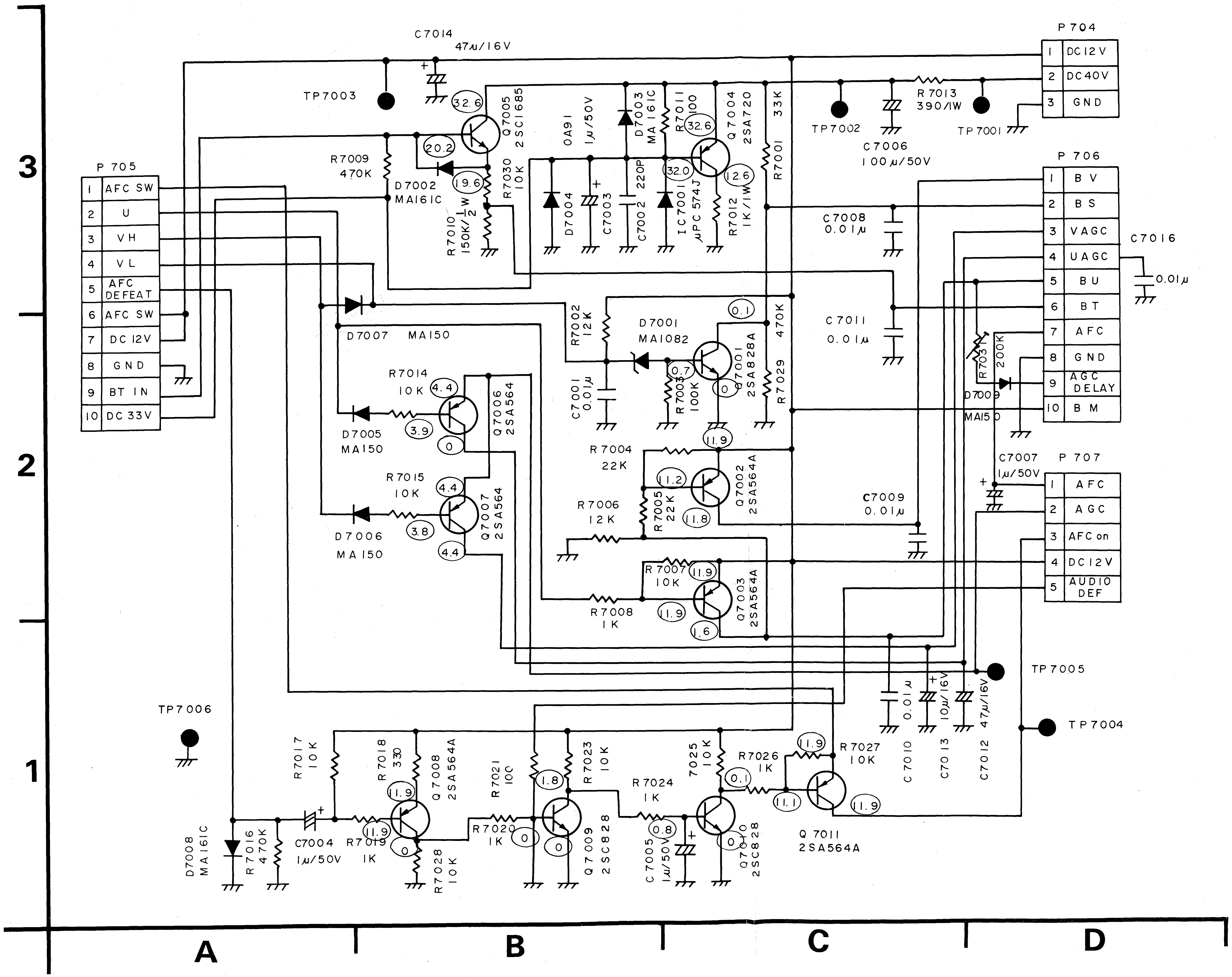

C774
25V4.7μ
TP708
C743
50V1
R740
5K
AUDIO LEVEL
Q704
2SC1317
C766
C733
0.056
C765
16V220
P703
1 12 V
2 VIDEO OUT
3 GND
4 GND
5 AUDIO OUT
R739
1200
L707
4.7
R732
100
R759
75
C732
10V1000
TP706
Q707
2SC828
R734
390
C771
50V1
C730
100P
C731
30P
R729
680
R730
1230
L706
33μ
R731
220
R761
10K
P708
C772
50V1
R763
5.6K
R762
12K
F

TV DEMODULATOR CIRCUIT BOARD


3
2
1
A
B
C
D
E
T704
EIV-10S594C-1
C714
C715
R715
T705
EIV-10S594E-1
R713
C712
TP702
C716
TP705
TP703
TP704
R712
C713
R711
Q702
2SC1686
J6
C711
T703
EIV-10S594B
J5
R709
R707
R708
R705
C717
TP701
J8
R703
R764
Q701
2SC1686
C759
R706
C709
R704
C707
C769
C708
C777
R769
R767
Q710
2SC1360
R768
R702
ADJACENT SND REJ
DIP
P701
R701
C770
R770
T702
EIV-10S594F-1
C701
C705
C706
C703
C702
L701
T701
Q703
2SC1687
C719
L702
T707
EIV6M412D
C718
R716
C720
C721
C734
T706
EIV-10S574D-1
R718
L708
SND REJ
C723
D701
R722
R721
R717
C722
R736
D702
W701
C725
R720
R719
L704
L703
C726
L705
T708
R723
C735
L709
C744
EIS 10S570F-1
TP707
C736
C737
C739
T709
EIS-10S570E-1
R760
R737
C740
IC702
AN240
C738
C774
L711
L710
C741
C742
C743
R738
X703
EFC-A6R0MC3A
TP708
Q709
2SC828R
R766
R740
AUDIO LEV
J3
R765
J2
R728
RF AGC
R727
J10
C758
R758
C773
R763
W702
C727
C775
R726
C765
J7
J8
2SA564R
R724
AN331
IC701
R735
R725
J1
J5
C733
Q708
J9
R76
C772
R732
R733
L707
C729
R729
C766
Q704
2SC1317
R730
C730
C731
R731
L706
R734
TP706
W703
C732
Q707
2SC828
R762
C771
R759
P703
J3
P708
J10
R747
R746
C755
C754
D707
C751
C750
R748
W706
R742
R741
Q705
2SC1637
T711
D704
C753
L714
R743
R744
C745
W704
C749
C752
D703
R751
AFC LEV
R745
D705
TL167390
D706
D708
R750
L712
C746
C748
T710
EIV-10S594A-1
C757
L715
L716
Q706
2SC1684
R753
R752
L713
C747
C756
R754
TP709
C764
C767
P702
TP710
L717
W705

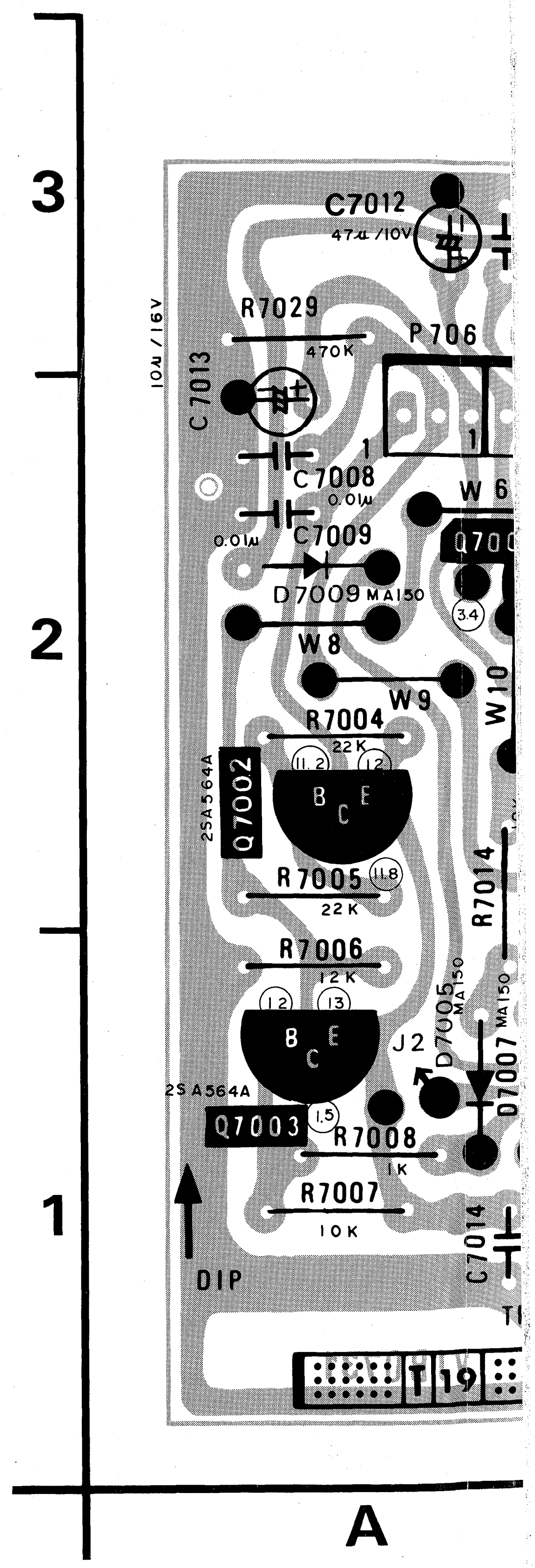
NV-8610-E

SELECTION SCHEMATIC DIAGRAM

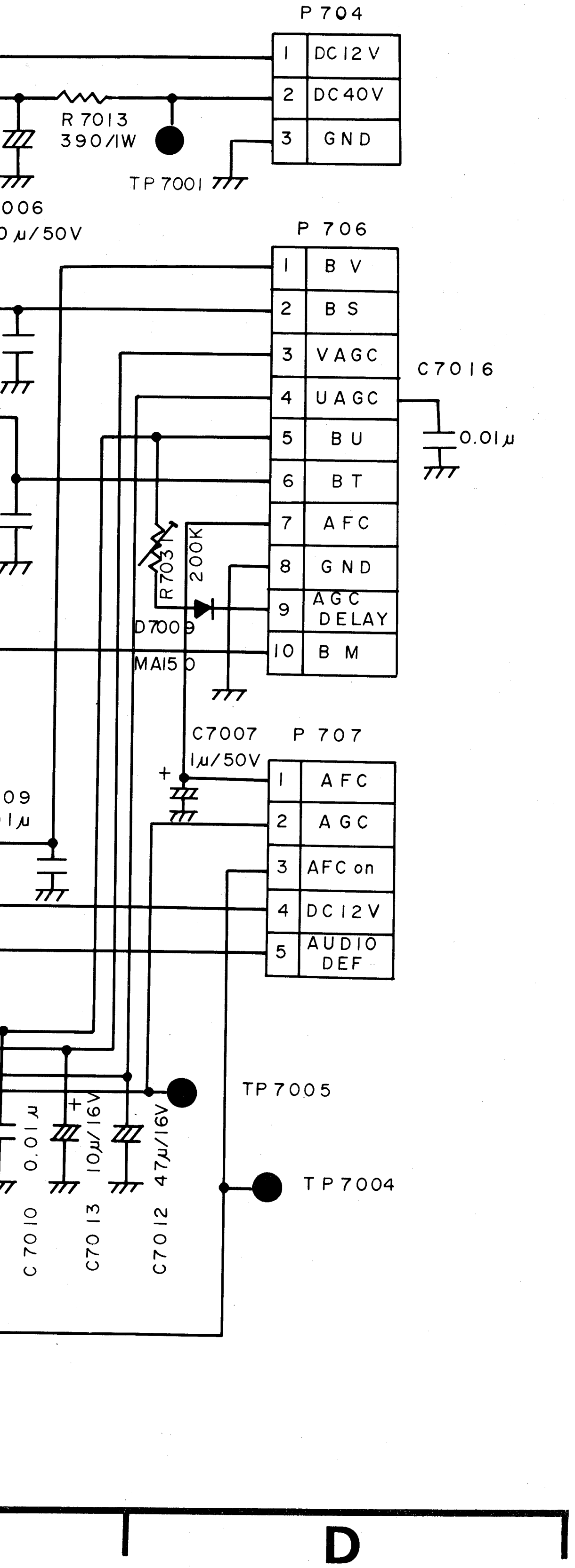


3
2
1
A
B
C
D
P 705
1 AFC SW
2 U
3 VH
4 VL
5 AFC DEFEAT
6 AFC SW
7 DC 12V
8 GND
9 BT IN
10 DC 33V
C7014
47μ/16V
TP7003
R7009
470K
D7002
MA161C
R7010
150K/½W
Q7005
2SC1685
R7030
10K
OA91
1μ/50V
D7004
C7003
C7002 220P
D7003
MA161C
R7011
100
IC7001
μPC574J
Q7004
2SA720
R7012
1K/1W
R7001
33K
TP7002
C7006
100μ/50V
R7013
390/1W
TP7001
P 704
1 DC12V
2 DC40V
3 GND
P 706
1 BV
2 BS
3 VAGC
4 UAGC
5 BU
6 BT
7 AFC
8 GND
9 AGC DELAY
10 BM
C7008
0.01μ
C7016
0.01μ
C7011
0.01μ
R7031
200K
D7009
MA150
D7007 MA150
R7002
12K
D7001
MA1082
Q7001
2SA828A
470K
R7029
C7001
0.01μ
R7003
100K
R7014
10K
D7005
MA150
Q7006
2SA564
R7015
10K
D7006
MA 150
Q7007
2SA564
R7004
22K
R7005
22K
R7006
12K
Q7002
2SA564A
C7009
0.01μ
C7007
1μ/50V
P 707
1 AFC
2 AGC
3 AFC on
4 DC12V
5 AUDIO DEF
R7007
10K
R7008
1K
Q7003
2SA564A
TP7005
TP7004
TP7006
C7010
0.01μ
C7013
10μ/16V
C7012
47μ/16V
R7017
10K
R7018
330
Q7008
2SA564A
R7021
100
R7023
10K
R7024
1K
7025
10K
R7026
1K
R7027
10K
Q 7011
2SA564A
D7008
MA161C
R7016
470K
C7004
1μ/50V
R7019
1K
R7028
10K
R7020
1K
Q7009
2SC828
C7005
1μ/50V
Q7010
2SC828
32.6
20.2
19.6
32.6
32.0
12.6
0.1
0.7
0
11.9
4.4
3.9
0
4.4
3.8
4.4
11.2
11.8
11.9
11.9
1.6
11.9
0
0
1.8
0
0.1
0.8
0
11.1
11.9
11.9

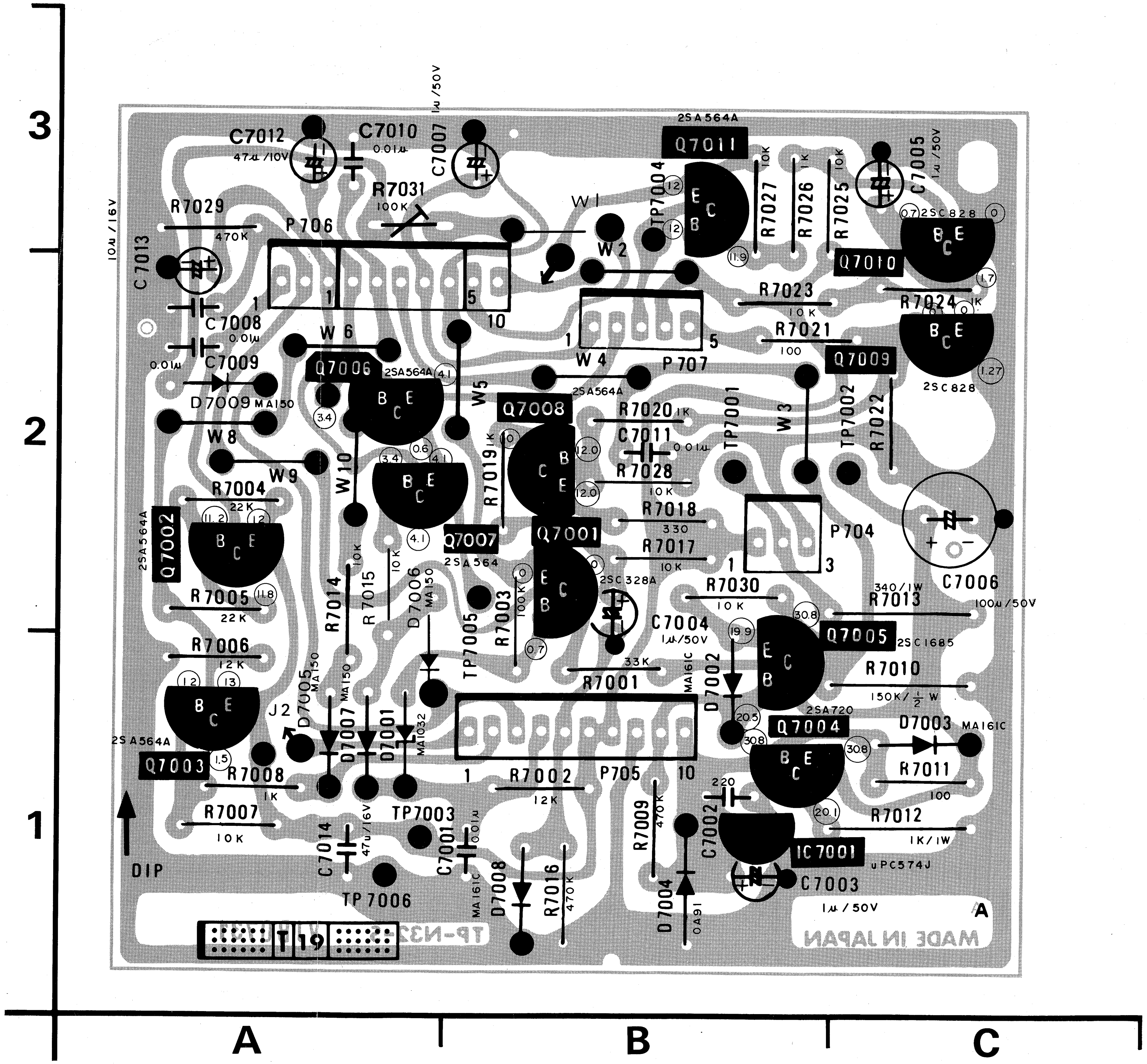
SELECTION CI



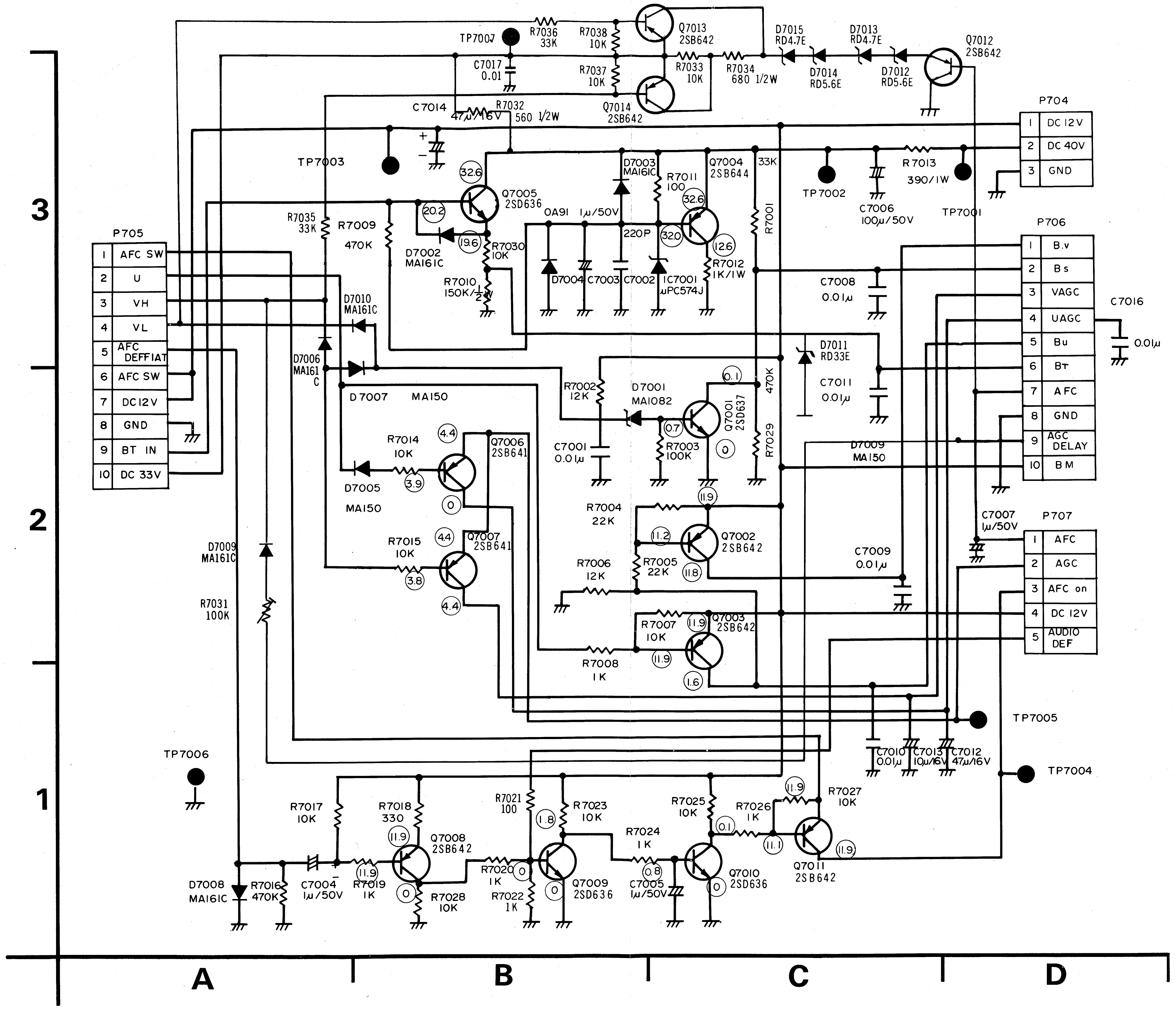
3
2
1
A
C7012
47μ/10V
R7029
470K
P706
10μ/16V
C7013
C7008
0.01μ
0.01μ
C7009
D7009 MA150
W 6
Q70
34
W8
W9
W10
R7004
22K
11.2
12
2SA564A
Q7002
B
C
E
R7005
11.8
22K
R7014
R7006
12K
12
13
B
C
E
D7005 MA150
D7007 MA150
J2
2SA564A
Q7003
1.5
R7008
1K
R7007
10K
DIP
C7014
T19

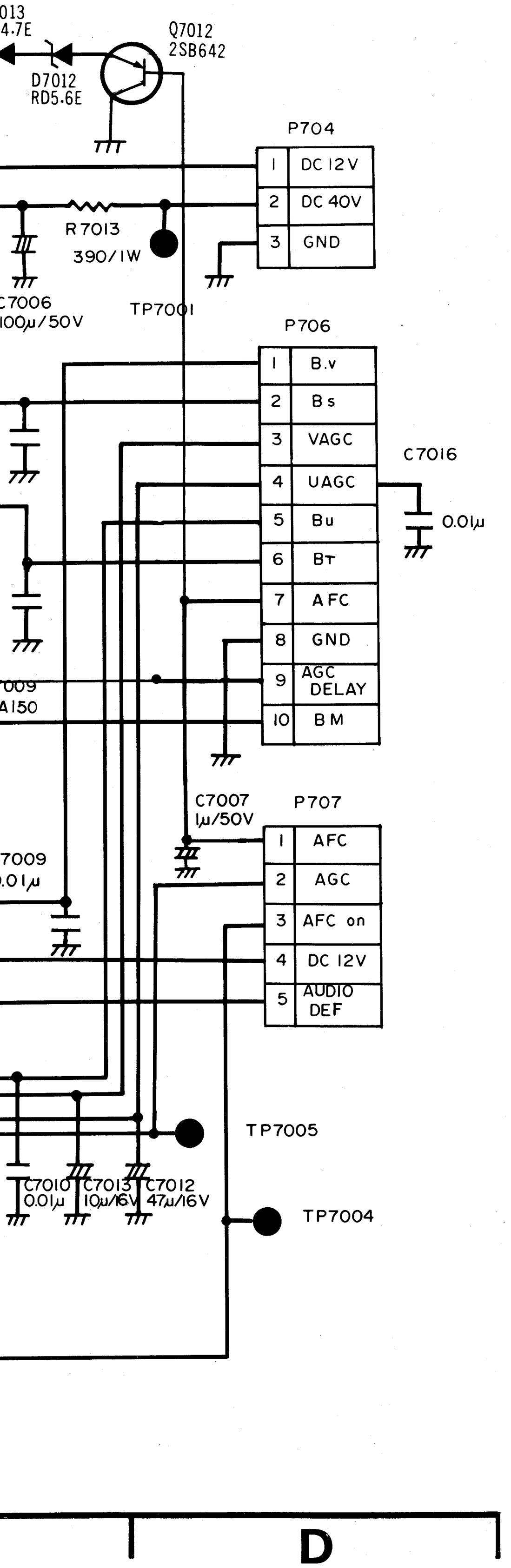

P704
1 DC12V
2 DC40V
3 GND
R7013
390/1W
TP7001
P706
1 BV
2 BS
3 VAGC
4 UAGC
5 BU
6 BT
7 AFC
8 GND
9 AGC DELAY
10 BM
C7016
0.01μ
R7031
200K
D7009
MA150
C7007
1μ/50V
P707
1 AFC
2 AGC
3 AFC on
4 DC12V
5 AUDIO DEF
TP7005
TP7004
0.01μ
10μ/16V
47μ/16V
C7010
C7013
C7012
D

SELECTION CIRCUIT BOARD

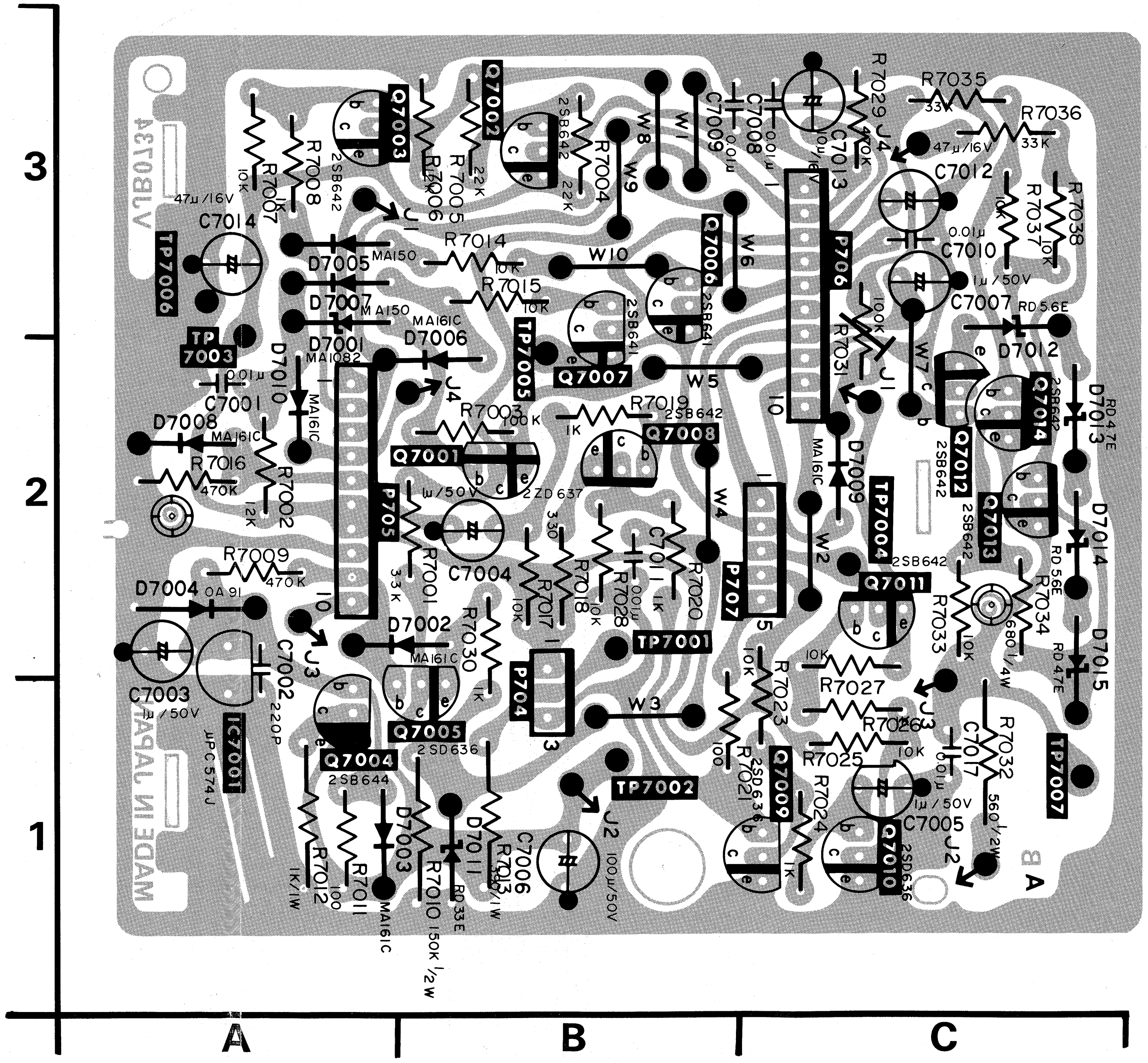

3
2
1
A
B
C
C7012
47μ/10V
C7010
0.01μ
C7007
1μ/50V
R7031
100K
R7029
470K
P706
C7013
10μ/16V
C7008
0.01μ
C7009
0.01μ
D7009
MA150
W1
W2
W4
W5
W6
W8
W9
W10
W3
Q7011
2SA564A
TP7004
R7027
10K
R7026
1K
R7025
10K
C7005
1μ/50V
Q7010
2SC828
R7023
10K
R7024
1K
R7021
100
Q7009
2SC828
P707
Q7006
2SA564A
Q7008
2SA564A
R7020
1K
C7011
0.01μ
R7028
10K
R7019
1K
TP7001
TP7002
R7022
R7018
330
R7017
10K
P704
C7006
100μ/50V
R7013
340/1W
Q7007
2SA564
Q7001
2SC328A
R7004
22K
Q7002
2SA564A
R7005
22K
R7014
10K
R7015
10K
D7006
MA150
TP7005
R7003
100K
C7004
1μ/50V
R7030
10K
Q7005
2SC1685
R7010
150K/½W
R7001
33K
D7002
MA161C
R7006
12K
Q7003
2SA564A
J2
D7005
MA150
D7007
MA150
D7001
MA1032
P705
R7002
12K
Q7004
2SA720
D7003
MA161C
R7011
100
R7008
1K
R7007
10K
TP7003
C7014
47μ/16V
C7001
0.01μ
TP7006
D7008
MA161C
R7016
470K
R7009
470K
C7002
220
D7004
OA91
IC7001
uPC574J
C7003
1μ/50V
R7012
1K/1W
DIP
T19
TP-N32
MADE IN JAPAN
A
B
C
E

SELECTION SCHEMATIC DIAGRAM


TP7007
R7036 33K
R7038 10K
Q7013 2SB642
C7017 0.01
R7037 10K
R7033 10K
R7034 680 1/2W
D7015 RD4.7E
D7014 RD5.6E
D7013 RD4.7E
D7012 RD5.6E
Q7012 2SB642
Q7014 2SB642
C7014 47μ/16V
R7032 560 1/2W
P704
1 DC 12V
2 DC 40V
3 GND
TP7003
32.6
Q7005 2SD636
20.2
19.6
R7035 33K
R7009 470K
D7002 MA161C
R7030 10K
R7010 150K/1/2W
D7003 MA161C
OA91
1μ/50V
R7011 100
32.6
Q7004 2SB644
33K
220P
32.0
12.6
D7004
C7003
C7002
IC7001 μPC574J
R7012 1K/1W
R7001
TP7002
C7006 100μ/50V
R7013 390/1W
TP7001
C7008 0.01μ
P706
1 B.v
2 Bs
3 VAGC
4 UAGC
5 Bu
6 BT
7 AFC
8 GND
9 AGC DELAY
10 BM
C7016 0.01μ
P705
1 AFC SW
2 U
3 VH
4 VL
5 AFC DEFFIAT
6 AFC SW
7 DC12V
8 GND
9 BT IN
10 DC 33V
D7010 MA161C
D7006 MA161C
D7007 MA150
D7011 RD33E
C7011 0.01μ
R7002 12K
D7001 MA1082
0.1
Q7001 2SD637
470K
0.7
R7003 100K
0
R7029
C7001 0.01μ
D7009 MA150
R7014 10K
4.4
Q7006 2SB641
3.9
0
D7005 MA150
R7004 22K
11.9
11.2
Q7002 2SB642
R7005 22K
11.8
R7015 10K
4.4
Q7007 2SB641
3.8
4.4
D7009 MA161C
R7031 100K
R7006 12K
C7009 0.01μ
C7007 1μ/50V
P707
1 AFC
2 AGC
3 AFC on
4 DC 12V
5 AUDIO DEF
R7007 10K
11.9
Q7003 2SB642
11.9
R7008 1K
1.6
TP7005
C7010 0.01μ
C7013 10μ/16V
C7012 47μ/16V
TP7004
TP7006
R7017 10K
R7018 330
11.9
Q7008 2SB642
R7021 100
1.8
R7023 10K
R7025 10K
0.1
R7026 1K
11.9
R7027 10K
R7024 1K
11.1
Q7011 2SB642
11.9
D7008 MA161C
R7016 470K
C7004 1μ/50V
11.9
R7019 1K
0
R7028 10K
R7020 1K
0
R7022 1K
0
Q7009 2SD636
0.8
C7005 1μ/50V
0
Q7010 2SD636
3
2
1
A
B
C
D

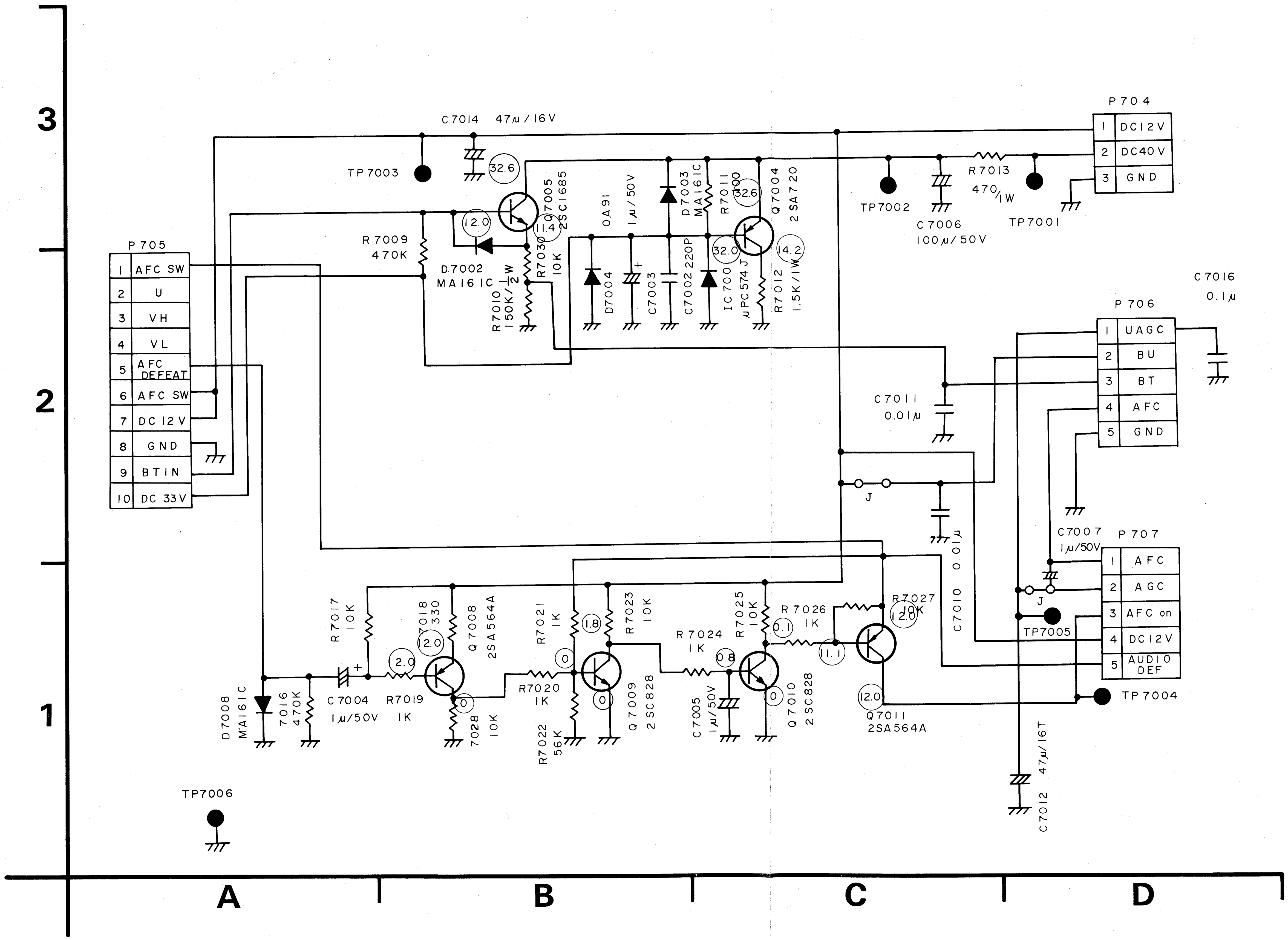

013
4.7E
D7012
RD5.6E
Q7012
2SB642
P704
1 DC 12V
2 DC 40V
3 GND
R7013
390/1W
C7006
100µ/50V
TP7001
P706
1 B.v
2 Bs
3 VAGC
4 UAGC
5 Bu
6 BT
7 AFC
8 GND
9 AGC DELAY
10 BM
C7016
0.01µ
009
A150
C7007
1µ/50V
P707
1 AFC
2 AGC
3 AFC on
4 DC 12V
5 AUDIO DEF
7009
.01µ
TP7005
TP7004
C7010 0.01µ
C7013 10µ/16V
C7012 47µ/16V
D

SELECTION CIRCUIT BOARD

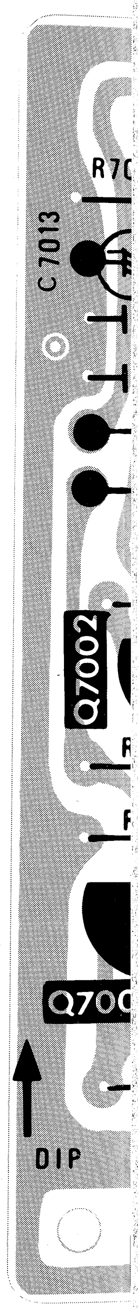

3
2
1
A
B
C
Q7003
Q7002
2SB642
R7008
R7007
10K
1K
R7006
R7005
22K
R7004
W8
W9
W1
C7009
C7008
0.01µ
C7013
10µ/16V
R7029
J4
40K
R7035
33K
R7036
33K
47µ/16V
C7012
R7037
R7038
10K
0.01µ
C7010
1µ/50V
C7007
RD5.6E
D7012
TP7006
47µ/16V
C7014
D7005
MA150
R7014
10K
R7015
10K
W10
Q7006
2SB641
W6
P706
D7007
MA150
MA161C
D7006
TP7005
Q7007
2SB641
R7031
100K
J1
W7
Q7014
2SB642
D7013
RD4.7E
TP7003
D7001
MA1082
D7010
0.01µ
C7001
J4
R7003
100K
R7019
1K
2SB642
Q7008
W5
10
D7008
MA161C
R7016
470K
R7002
12K
Q7001
1µ/50V
2ZD637
D7009
MA161C
TP7004
Q7012
2SB642
Q7013
2SB642
D7014
RD5.6E
P705
R7001
33K
C7004
R7030
R7017
R7018
R7028
C7011
0.01µ
1K
R7020
W4
W2
P707
5
2SB642
Q7011
R7033
R7034
680 1/4W
D7015
RD4.7E
R7009
470K
D7004
OA91
C7003
1µ/50V
C7002
220P
J3
D7002
MA161C
Q7005
2SD636
Q7004
2SB644
IC7001
µPC574J
P704
3
W3
TP7001
R7023
10K
R7027
10K
R7026
R7025
J3
R7021
100
Q7009
2SD636
C7017
0.01µ
R7032
560 1/2W
TP7007
TP7002
R7024
1K
Q7010
2SD636
C7005
1µ/50V
J2
R7012
1K/1W
R7011
100
D7003
MA161C
R7010
150K 1/2W
D7011
RD33E
R7013
1W
C7006
100µ/50V
J2
B
A
MADE IN JAPAN
VBOL07A

NV-8610-B

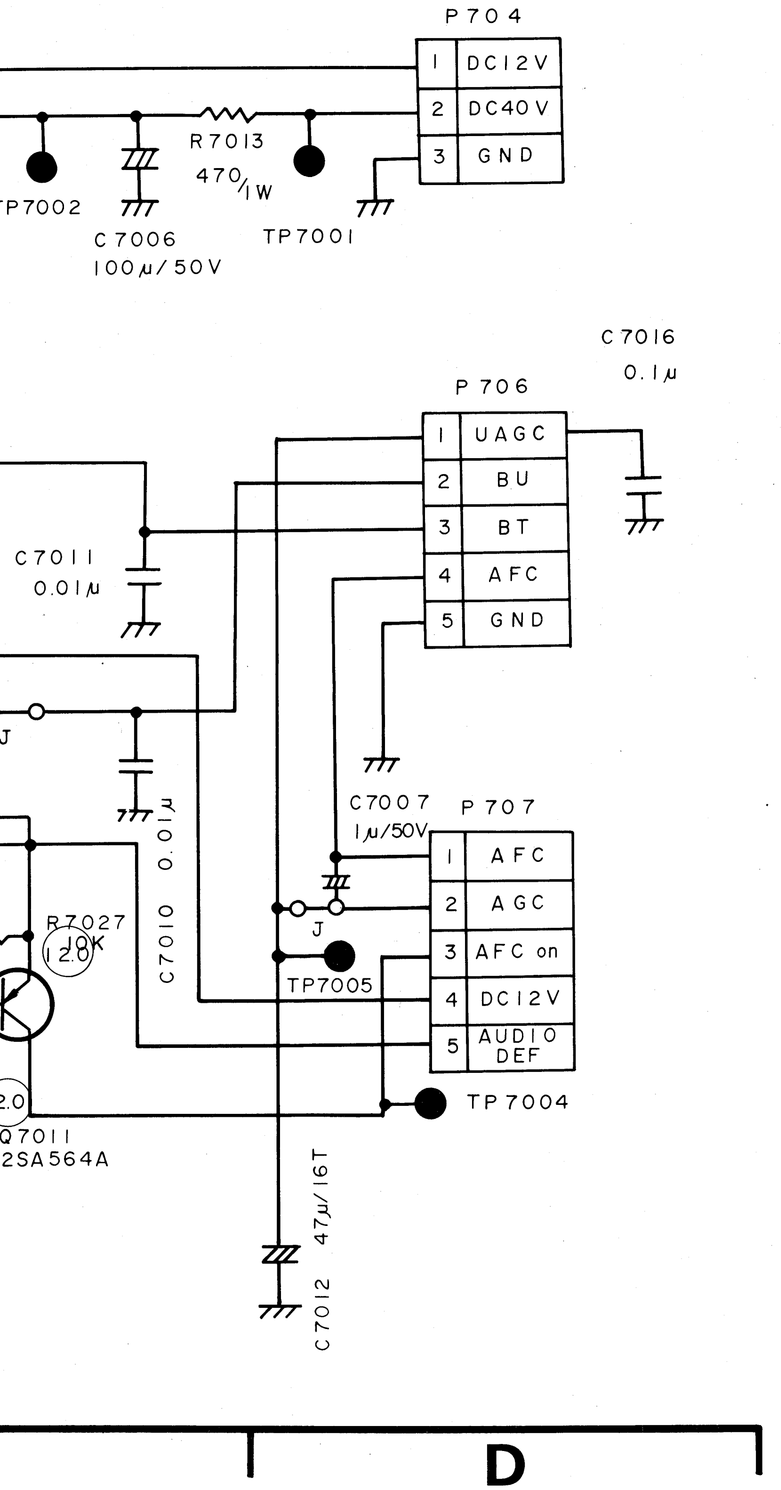
SELECTION SCHEMATIC DIAGRAM


3
2
1
A
B
C
D
P704
1 DC12V
2 DC40V
3 GND
P705
1 AFC SW
2 U
3 VH
4 VL
5 AFC DEFEAT
6 AFC SW
7 DC 12V
8 GND
9 BTIN
10 DC 33V
P706
1 UAGC
2 BU
3 BT
4 AFC
5 GND
P707
1 AFC
2 AGC
3 AFC on
4 DC12V
5 AUDIO DEF
C7014 47μ/16V
TP7003
32.6
12.0
11.4
Q7005 2SC1685
R7009 470K
D7002 MA161C
R7010 150K/1/2W
R7030 10K
0A91
D7004
1μ/50V
C7003
D7003 MA161C
C7002 220P
R7011 100
32.6
32.0
IC7001 μPC574J
Q7004 2SA720
14.2
R7012 1.5K/1W
TP7002
C7006 100μ/50V
R7013 470/1W
TP7001
C7016 0.1μ
C7011 0.01μ
J
C7010 0.01μ
C7007 1μ/50V
TP7005
TP7004
C7012 47μ/16T
R7017 10K
R7018 330
12.0
2.0
Q7008 2SA564A
D7008 MA161C
R7016 470K
C7004 1μ/50V
R7019 1K
0
R7028 10K
R7021 1K
0
1.8
R7020 1K
R7022 56K
R7023 10K
0
Q7009 2SC828
R7024 1K
0.8
C7005 1μ/50V
R7025 10K
0.1
0
Q7010 2SC828
R7026 1K
11.1
R7027 10K
12.0
12.0
Q7011 2SA564A
TP7006

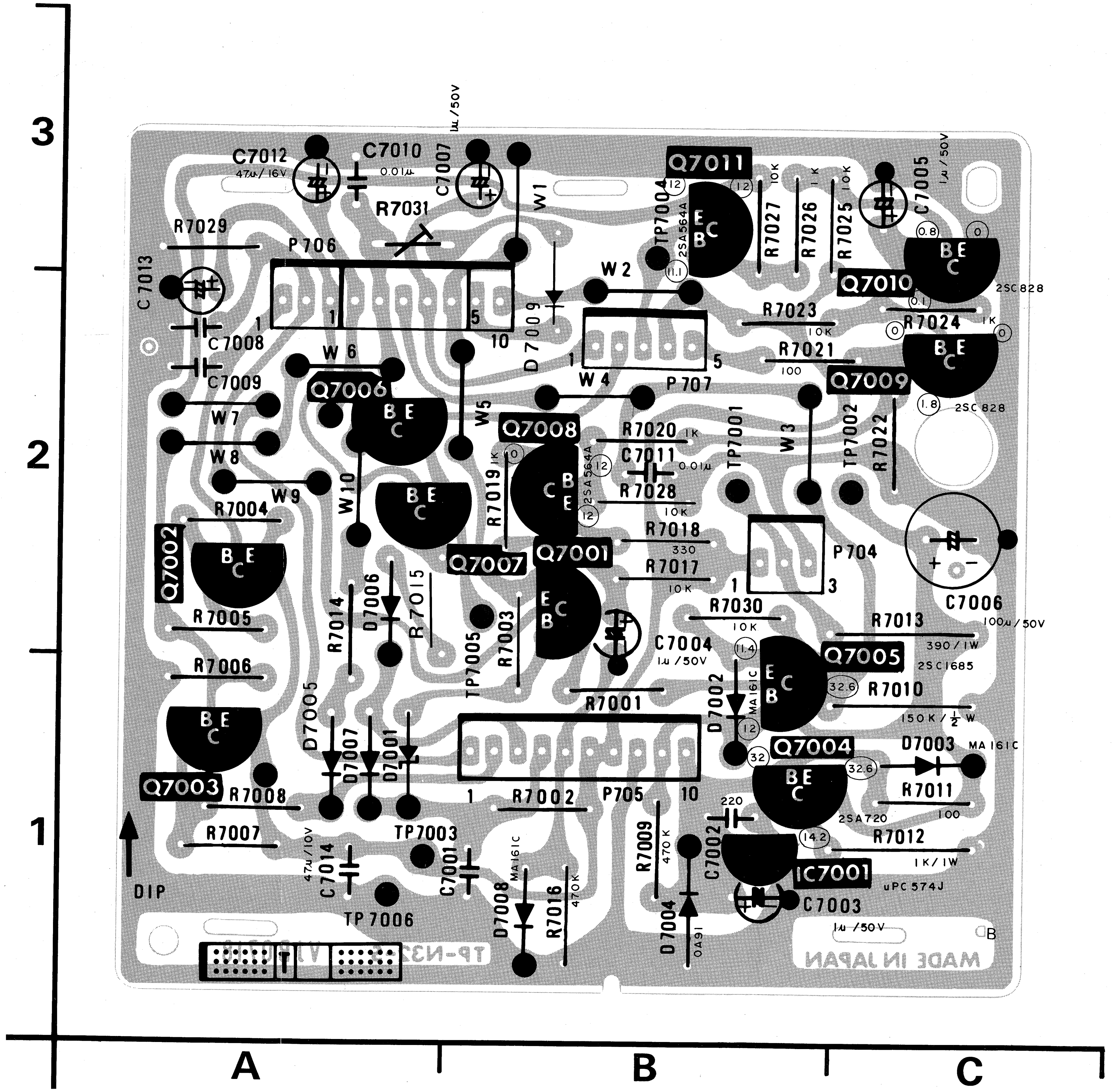
SELECTIO


R70
C7013
Q7002
Q700
DIP

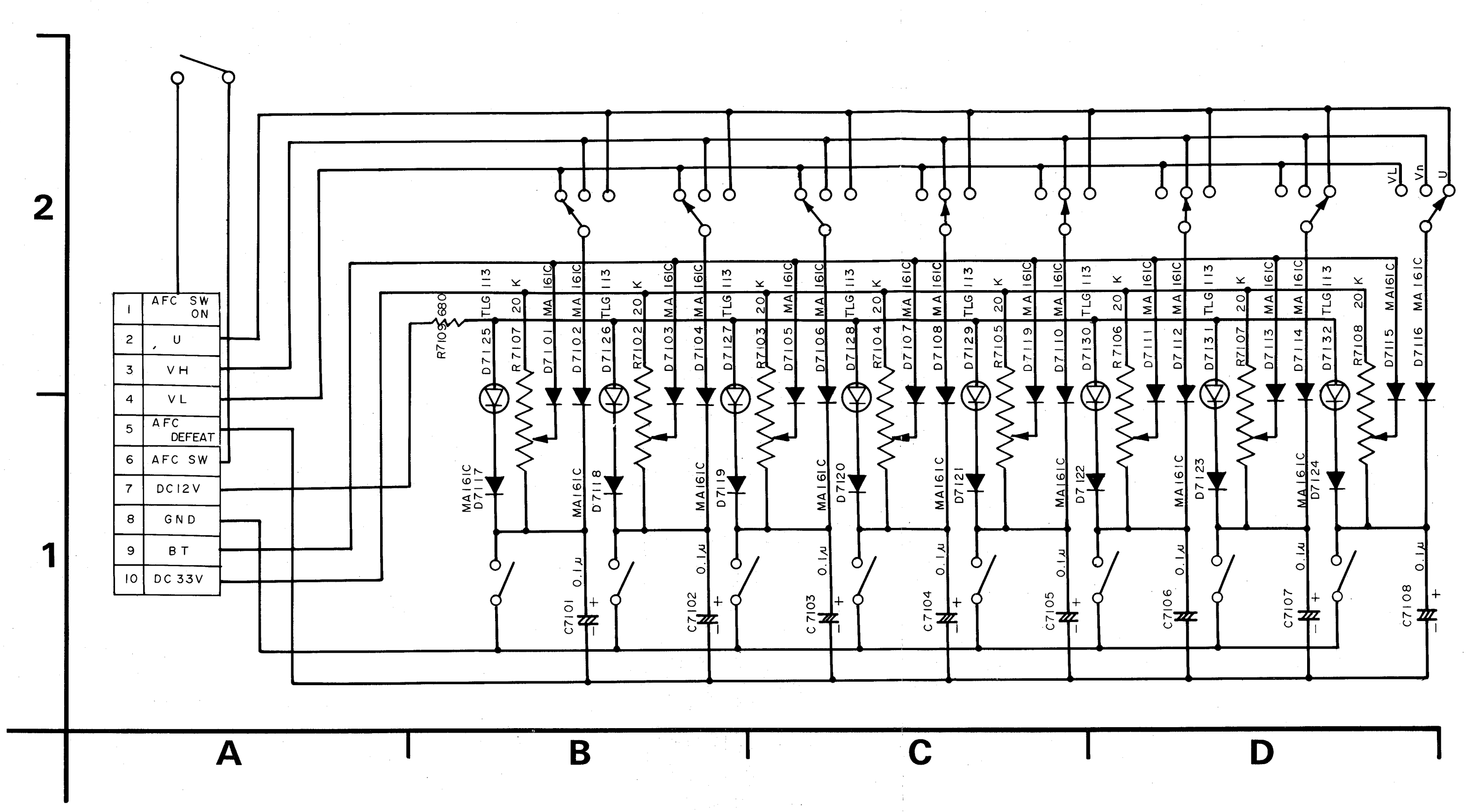
3
2
1


P704
1 DC12V
2 DC40V
3 GND
R7013
470/1W
TP7002
C7006
100μ/50V
TP7001
C7016
0.1μ
P706
1 UAGC
2 BU
3 BT
4 AFC
5 GND
C7011
0.01μ
C7010 0.01μ
C7007
1μ/50V
P707
1 AFC
2 AGC
3 AFC on
4 DC12V
5 AUDIO DEF
R7027
10K
12.0
J
TP7005
TP7004
Q7011
2SA564A
C7012 47μ/16T
D

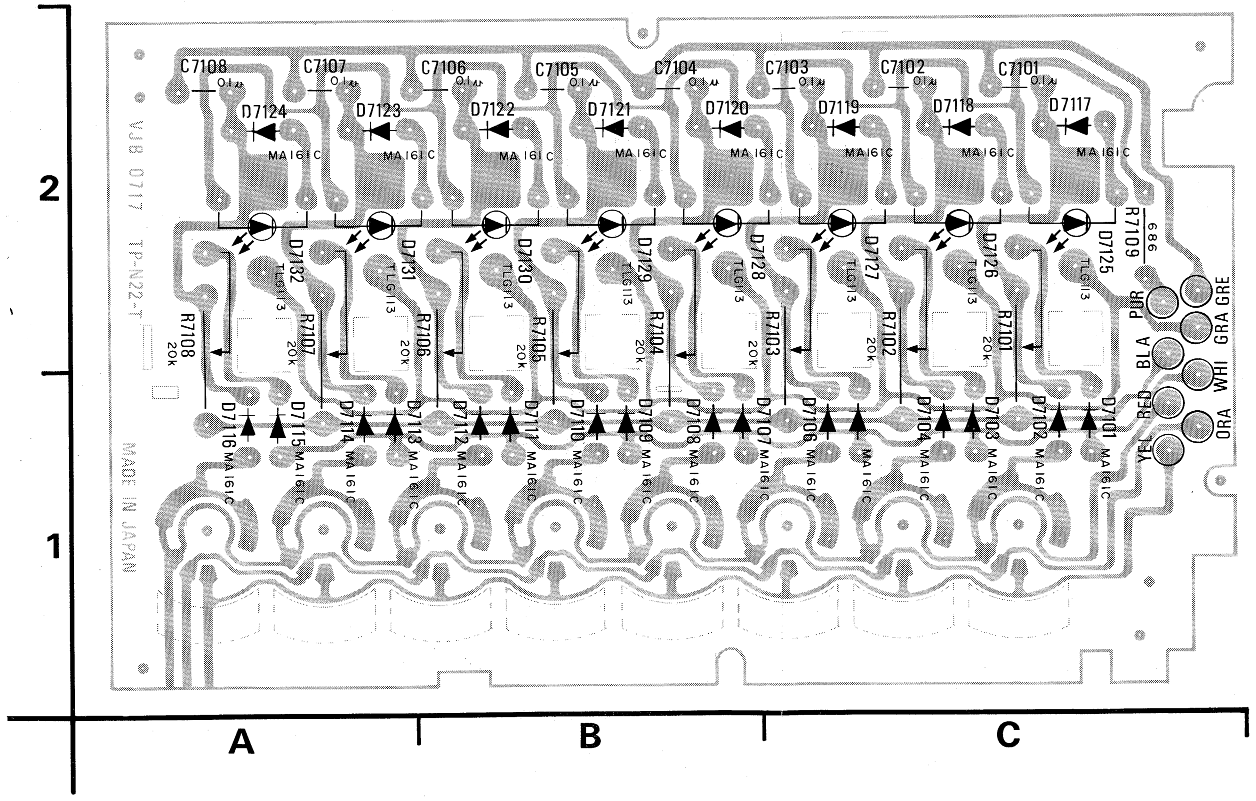
SELECTION CIRCUIT BOARD


3
2
1
A
B
C
C7012 47μ/16V
C7010 0.01μ
C7007 1μ/50V
R7031
W1
Q7011
2SA564A
TP7004
R7027 10K
R7026 1K
R7025 10K
C7005 1μ/50V
R7029
P706
C7013
C7008
C7009
W2
D7009
Q7010 2SC828
R7023 10K
R7024 1K
R7021 100
Q7009 2SC828
W6
W4
P707
Q7006
W7
W8
W9
W5
Q7008
R7020 1K
C7011 0.01μ
R7028 10K
TP7001
W3
TP7002
R7022
W10
R7019 1K
2SA564A
R7004
Q7002
Q7007
Q7001
R7018 330
R7017 10K
P704
C7006 100μ/50V
R7005
D7006
R7015
R7014
TP7005
R7003
R7030 10K
C7004 1μ/50V
R7013 390/1W
Q7005 2SC1685
R7006
R7010 150K/½W
D7002 MA161C
D7005
D7007
D7001
R7001
Q7004 2SA720
D7003 MA161C
Q7003
R7008
R7002
P705
R7011 100
R7007
C7014 47μ/10V
TP7003
C7001
R7009 470K
C7002 220
R7012 1K/1W
IC7001 uPC574J
C7003 1μ/50V
DIP
TP7006
D7008 MA161C
R7016 470K
D7004 OA91
TP-N32
MADE IN JAPAN

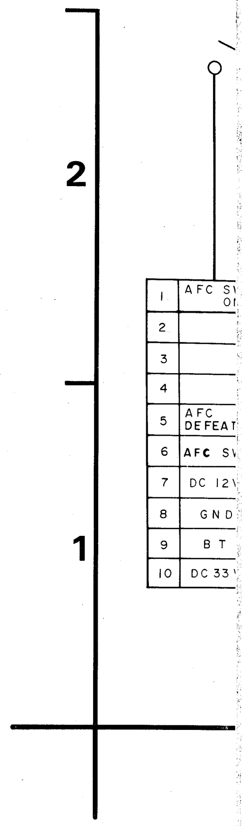
TUNER SWITCH SCHEMATIC DIAGRAM


2
1
A
B
C
D
1 AFC SW ON
2 U
3 VH
4 VL
5 AFC DEFEAT
6 AFC SW
7 DC12V
8 GND
9 BT
10 DC 33V
R7109 680
D7125 TLG113
R7101 20K
D7101 MA161C
D7117 MA161C
D7118 MA161C
D7119 MA161C
D7120 MA161C
D7121 MA161C
D7122 MA161C
D7123 MA161C
D7124 MA161C
C7101 0.1μ
C7102 0.1μ
C7103 0.1μ
C7104 0.1μ
C7105 0.1μ
C7106 0.1μ
C7107 0.1μ
C7108 0.1μ
VL
VH
U

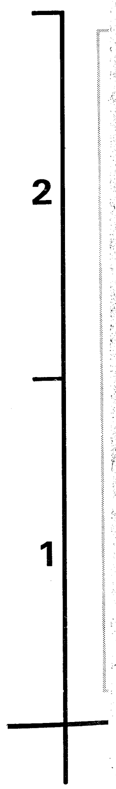
TUNER SWITCH CIRCUIT BOARD

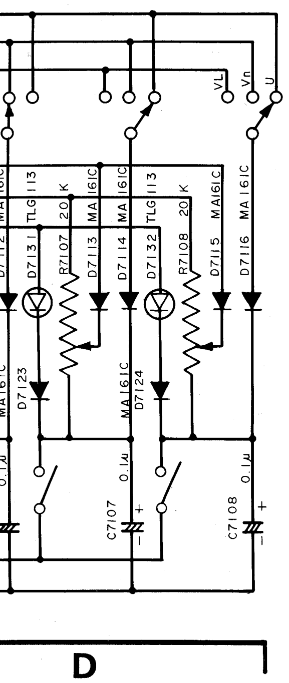

2
1
A
B
C
C7108 0.1μ
C7107 0.1μ
C7106 0.1μ
C7105 0.1μ
C7104 0.1μ
C7103 0.1μ
C7102 0.1μ
C7101 0.1μ
D7124
D7123
D7122
D7121
D7120
D7119
D7118
D7117
MA161C
D7132
D7131
D7130
D7129
D7128
D7127
D7126
D7125
TLG113
R7109 680
R7108 20k
R7107 20k
R7106 20k
R7105 20k
R7104 20k
R7103 20k
R7102 20k
R7101 20k
D7116
D7115
D7114
D7113
D7112
D7111
D7110
D7109
D7108
D7107
D7106
D7105
D7104
D7103
D7102
D7101
PUR
GRA
GRE
BLA
WHI
RED
ORA
YEL
VJB 0717
TP-N22-T
MADE IN JAPAN

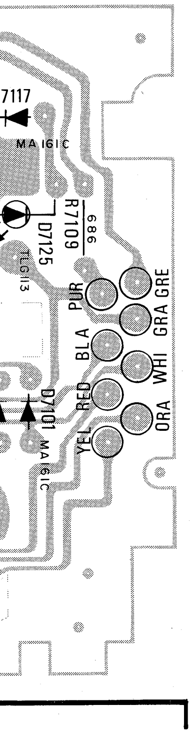
TUNER S


2
1
1 AFC S
2
3
4
5 AFC DEFEAT
6 AFC S
7 DC 12V
8 GND
9 BT
10 DC 33V

TUN

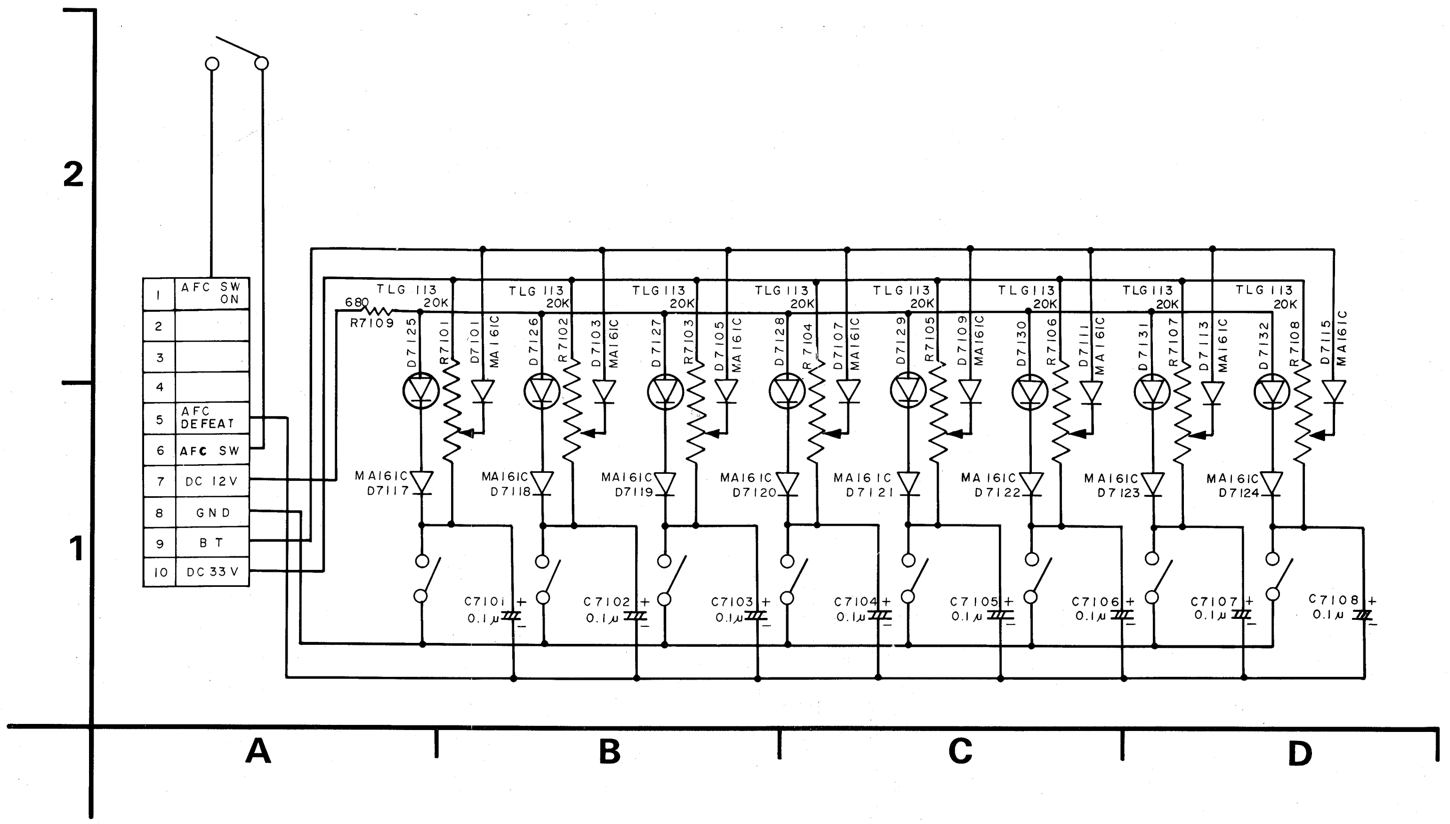



D7113
D7114
D7115
D7116
D7123
D7124
D7132
R7107 20K
R7108 20K
TLG 113
MA161C
C7107 0.1μ
C7108 0.1μ
VL
VH
U
D

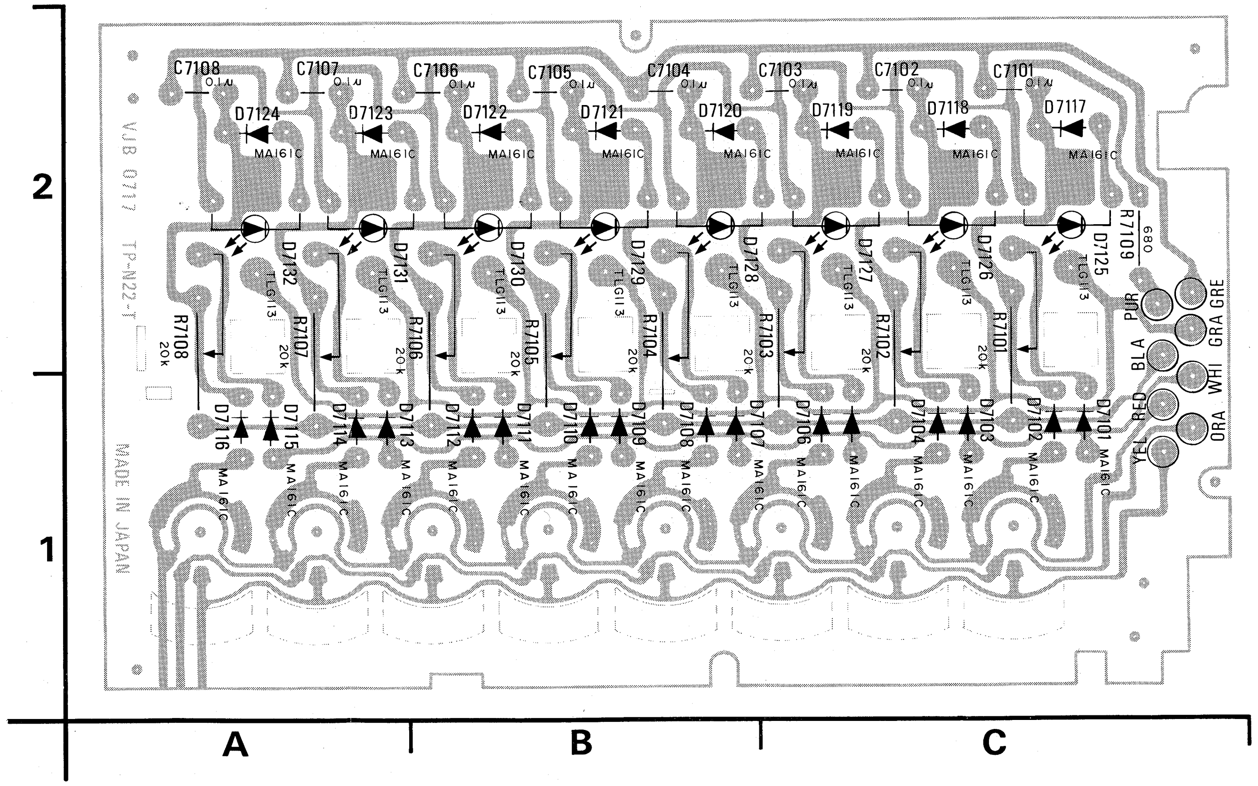

D7117
MA161C
R7109
686
D7125
TLG113
PUR
BLA
RED
YEL
GRE
GRA
WHI
ORA
D7101
MA161C

NV-8610-B

TUNER SWITCH SCHEMATIC DIAGRAM

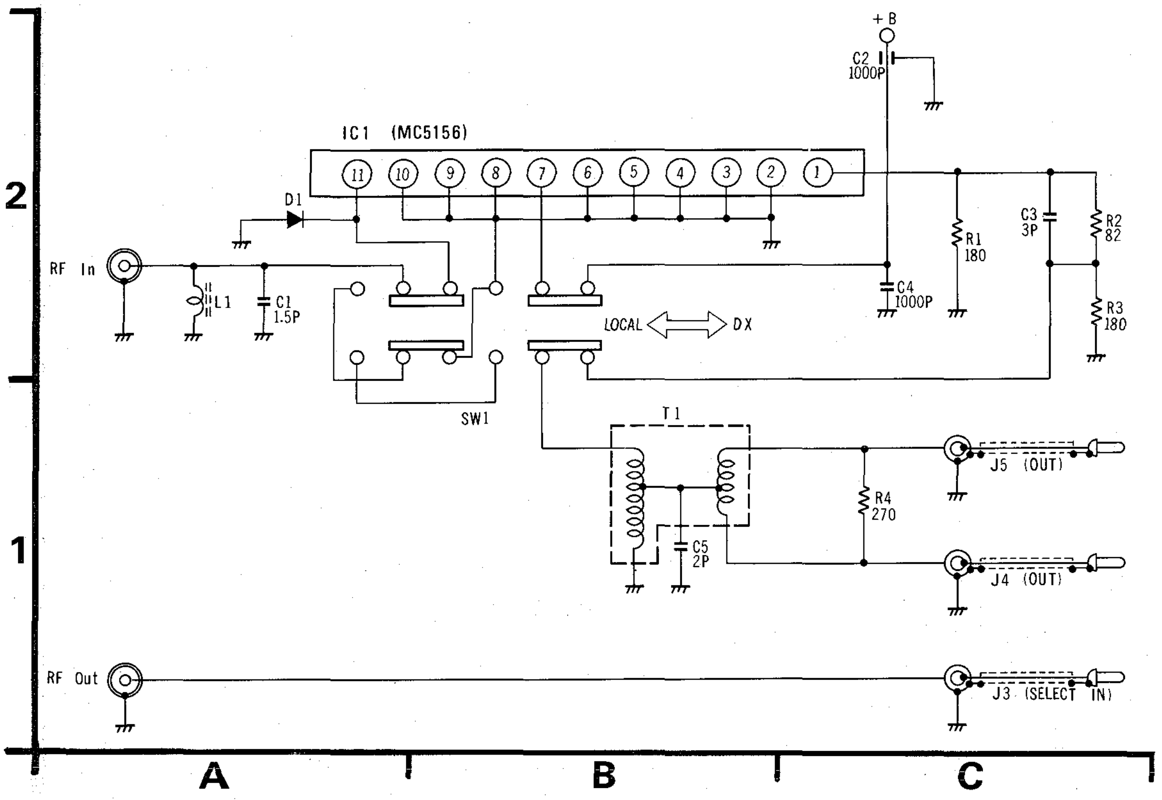

2
1
1 AFC SW ON
2
3
4
5 AFC DEFEAT
6 AFC SW
7 DC 12V
8 GND
9 BT
10 DC 33V
680
R7109
TLG 113 20K
D7125
D7126
D7127
D7128
D7129
D7130
D7131
D7132
R7101
R7102
R7103
R7104
R7105
R7106
R7107
R7108
D7101 MA161C
D7103 MA161C
D7105 MA161C
D7107 MA161C
D7109 MA161C
D7111 MA161C
D7113 MA161C
D7115 MA161C
MA161C D7117
MA161C D7118
MA161C D7119
MA161C D7120
MA161C D7121
MA161C D7122
MA161C D7123
MA161C D7124
C7101 0.1μ
C7102 0.1μ
C7103 0.1μ
C7104 0.1μ
C7105 0.1μ
C7106 0.1μ
C7107 0.1μ
C7108 0.1μ
A
B
C
D

TUNER SWITCH CIRCUIT BOARD


2
1
C7108 0.1μ
C7107 0.1μ
C7106 0.1μ
C7105 0.1μ
C7104 0.1μ
C7103 0.1μ
C7102 0.1μ
C7101 0.1μ
D7124
D7123
D7122
D7121
D7120
D7119
D7118
D7117
MA161C
VJB 0717
TP-N22-T
MADE IN JAPAN
D7132
D7131
D7130
D7129
D7128
D7127
D7126
D7125
TLG113
R7109 680
R7108 20k
R7107 20k
R7106 20k
R7105 20k
R7104 20k
R7103 20k
R7102 20k
R7101 20k
D7116
D7115
D7114
D7113
D7112
D7111
D7110
D7109
D7108
D7107
D7106
D7105
D7104
D7103
D7102
D7101
PUR
BLA
RED
YEL
GRE
GRA
WHI
ORA
A
B
C

NV-8610-E/-EO

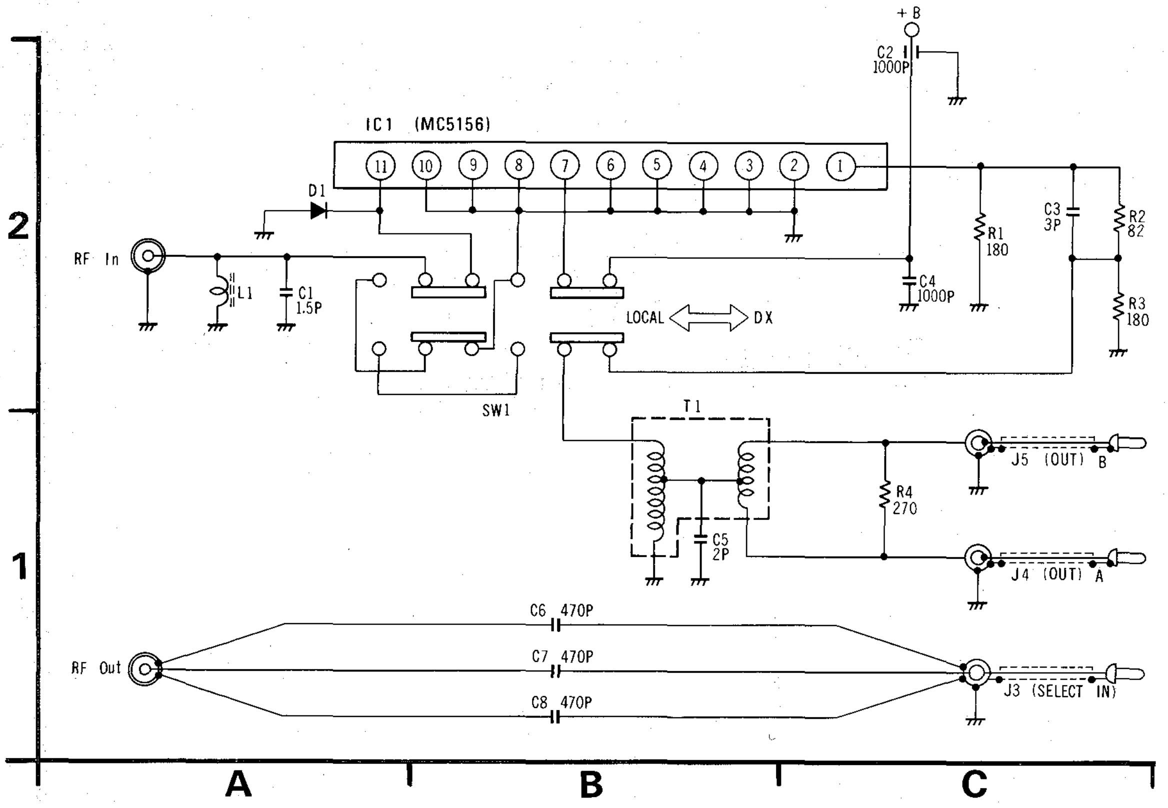
ANTENNA BOOSTER SCHEMATIC DIAGRAM



+B
C2 1000P
IC1 (MC5156)
11
10
9
8
7
6
5
4
3
2
1
D1
RF In
L1
C1 1.5P
C4 1000P
R1 180
C3 3P
R2 82
R3 180
LOCAL
DX
SW1
T1
R4 270
C5 2P
J5 (OUT)
J4 (OUT)
RF Out
J3 (SELECT IN)
2
1
A
B
C

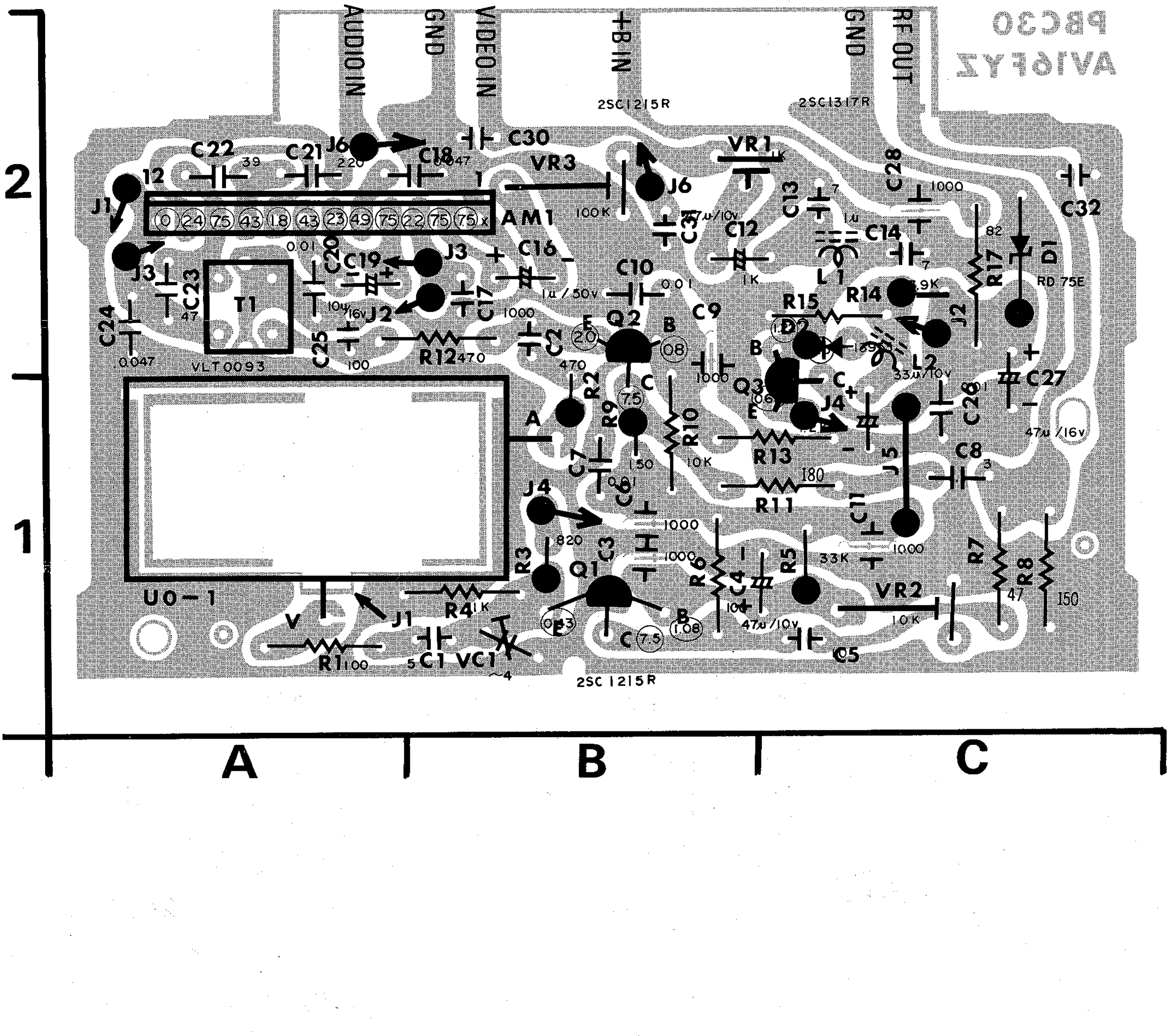
NV-8610-B

ANTENNA BOOSTER SCHEMATIC DIAGRAM

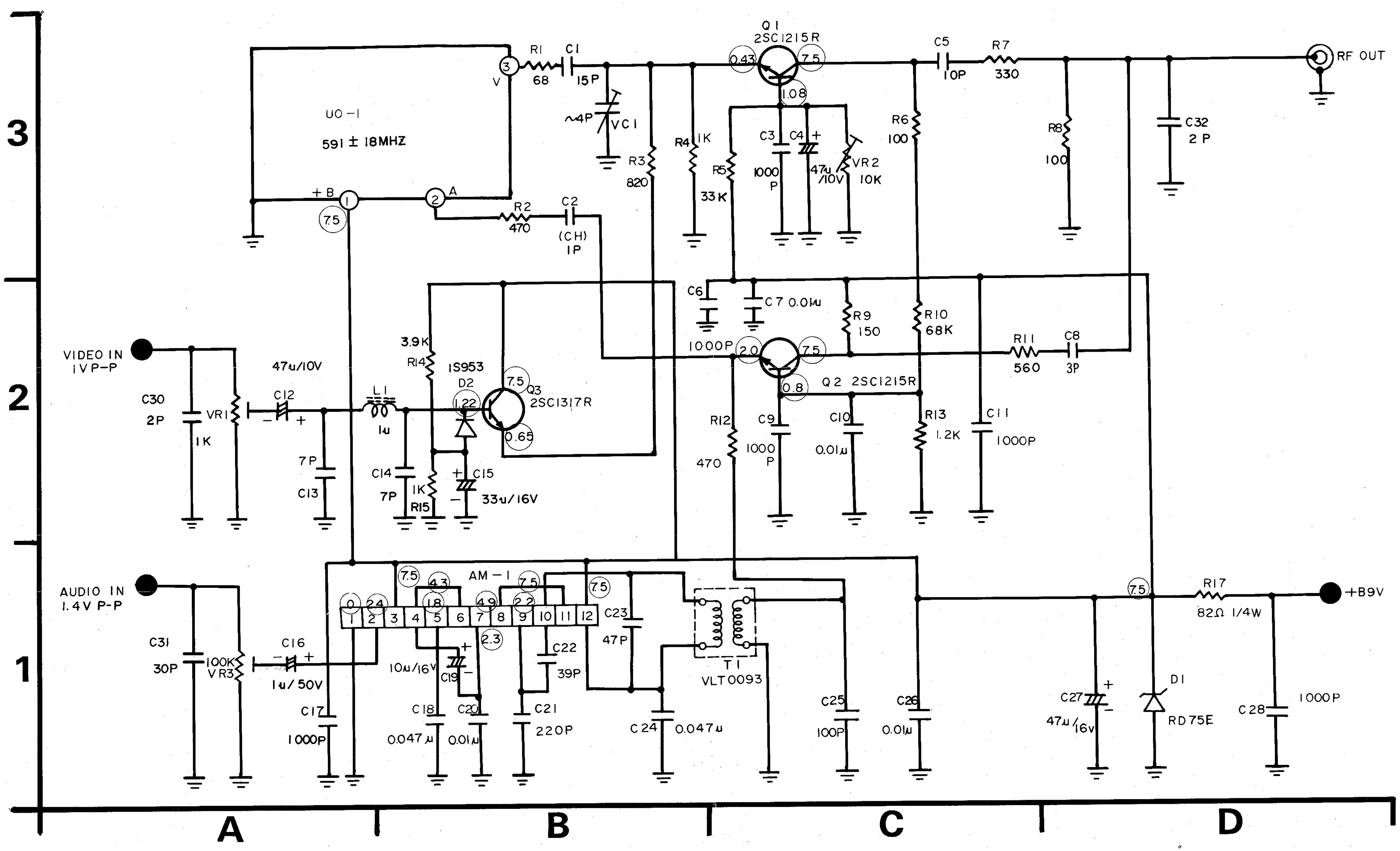


+B
C2 1000P
IC1 (MC5156)
11
10
9
8
7
6
5
4
3
2
1
D1
RF In
L1
C1 1.5P
C4 1000P
R1 180
C3 3P
R2 82
R3 180
LOCAL
DX
SW1
T1
R4 270
C5 2P
J5 (OUT) B
J4 (OUT) A
C6 470P
C7 470P
C8 470P
RF Out
J3 (SELECT IN)
2
1
A
B
C

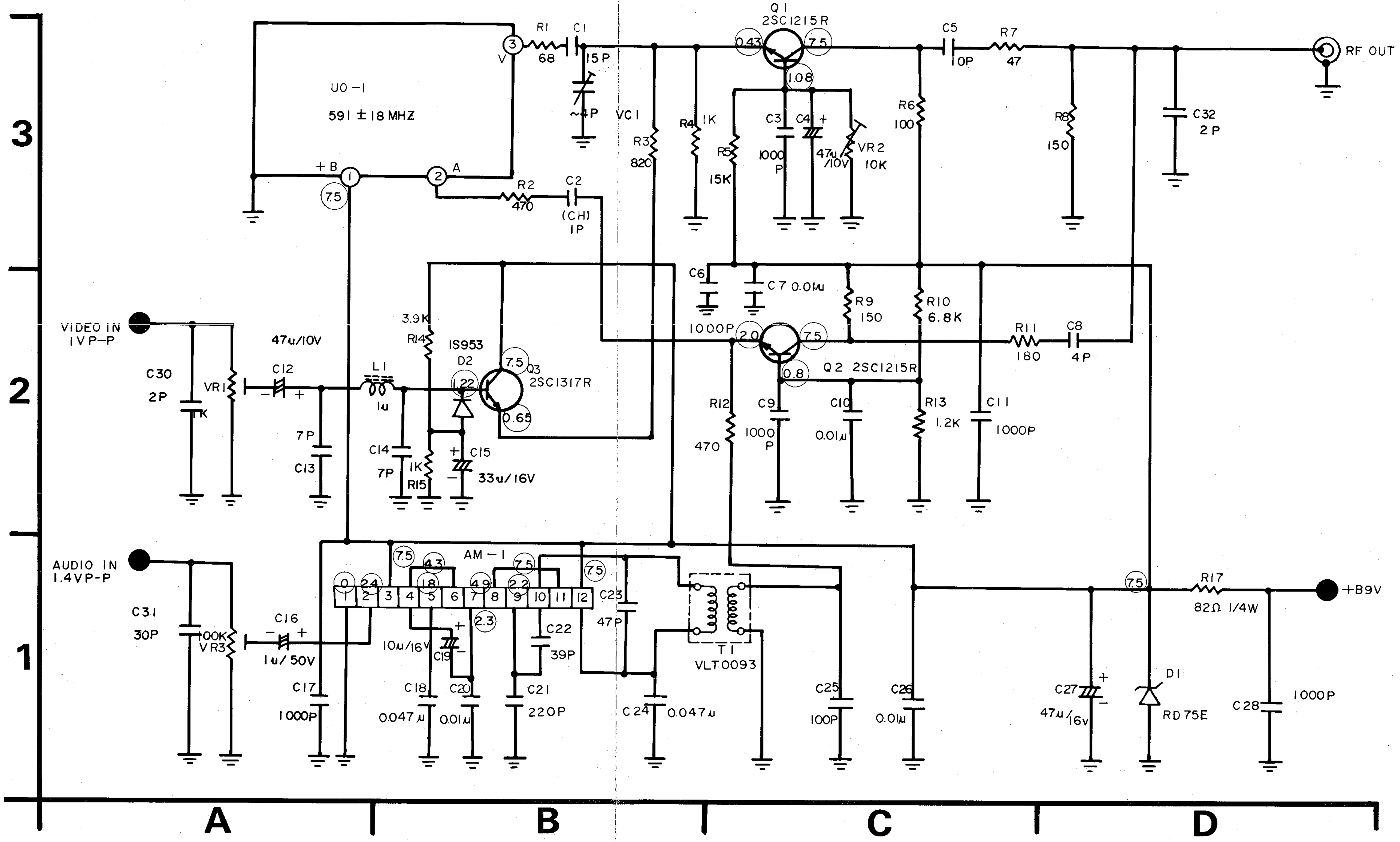
RF CONVERTER CIRCUIT BOARD


AUDIO IN
GND
VIDEO IN
+B IN
GND
RF OUT
PBC30
AVI6FYZ
2SC1215R
2SC1317R
C22
39
C21
J6
220
C18
0.047
C30
VR3
100K
J6
VR1
1K
C13
7
C28
1000
C32
J1
12
0 24 75 43 18 43 23 49 75 22 75 75
AM1
C31
47μ/10v
C12
1K
C14
1μ
L1
7
82
R17
D1
RD 75E
J3
C23
47
T1
0.01
C20
C19
10μ/16v
J3
J2
C16
1μ/50v
C17
1000
C10
0.01
C9
R15
R14
3.9K
J2
C24
0.047
VLT0093
C25
100
R12 470
C2
E
Q2
B
20
08
470
C
7.5
R2
R9
R10
10K
150
C7
0.81
C6
1000
D2
B
Q3
E
C
J4
L2
33μ/10v
C26
C27
47μ/16v
R13
R11
180
C8
3
J5
C11
1000
A
J4
820
R3
C3
1000
Q1
R6
C4
10
47μ/10v
R5
33K
VR2
10K
R7
47
R8
150
U0-1
V
J1
R4 1K
R1 100
C1
5
VC1
~4
E
C
7.5
B
1.08
C5
2SC 1215R
2
1
A
B
C

RF CONVERTER SCHEMATIC DIAGRAM


3
2
1
A
B
C
D
UO-1
591 ± 18MHZ
V
A
+B
7.5
R1 68
C1 15P
~4P
VC1
R2 470
C2 (CH) 1P
R3 820
R4 1K
R5 33K
Q1 2SC1215R
0.43
7.5
1.08
C3 1000P
C4 47u/10V
VR2 10K
C5 10P
R7 330
R6 100
R8 100
C32 2P
RF OUT
C6 1000P
C7 0.01u
R9 150
R10 68K
2.0
7.5
0.8
Q2 2SC1215R
R11 560
C8 3P
R12 470
C9 1000P
C10 0.01u
R13 1.2K
C11 1000P
VIDEO IN 1V P-P
C30 2P
VR1 1K
47u/10V
C12
C13 7P
L1 1u
C14 7P
3.9K R14
1S953 D2
7.5
1.22
0.65
Q3 2SC1317R
R15 1K
C15 33u/16V
AUDIO IN 1.4V P-P
C31 30P
100K VR3
C16 1u/50V
C17 1000P
AM-1
7.5
4.3
7.5
7.5
0
2.4
1.8
4.9
2.2
2.3
1 2 3 4 5 6 7 8 9 10 11 12
C19 10u/16V
C18 0.047u
C20 0.01u
C21 220P
C22 39P
C23 47P
C24 0.047u
T1 VLT0093
C25 100P
C26 0.01u
C27 47u/16V
D1 RD75E
R17 82Ω 1/4W
C28 1000P
7.5
+B9V

RF CONVERTER SCHEMATIC DIAGRAM


UO-1
591 ± 18 MHZ
+B
A
V
R1 68
C1 15P
~4P
VC1
R2 470
C2 (CH) 1P
Q1 2SC1215R
0.43
7.5
1.08
R3 820
R4 1K
R5 15K
C3 1000P
C4 47u/10V
VR2 10K
R6 100
C5 10P
R7 47
R8 150
C32 2P
RF OUT
VIDEO IN 1VP-P
C30 2P
VR1 1K
47u/10V
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L1 1u
C13 7P
C14 7P
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1S953 D2
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1K R15
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C6 1000P
C7 0.01u
R9 150
R10 6.8K
R11 180
C8 4P
Q2 2SC1215R
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0.8
R12 470
C9 1000P
C10 0.01u
R13 1.2K
C11 1000P
AUDIO IN 1.4VP-P
C31 30P
100K VR3
C16 1u/50V
C17 1000P
AM-1
0
2.4
7.5
4.3
1.8
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7.5
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C19 10u/16V
C18 0.047u
C20 0.01u
C21 220P
C22 39P
C23 47P
C24 0.047u
T1 VLT0093
C25 100P
C26 0.01u
C27 47u/16V
D1 RD75E
R17 82Ω 1/4W
C28 1000P
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A
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C
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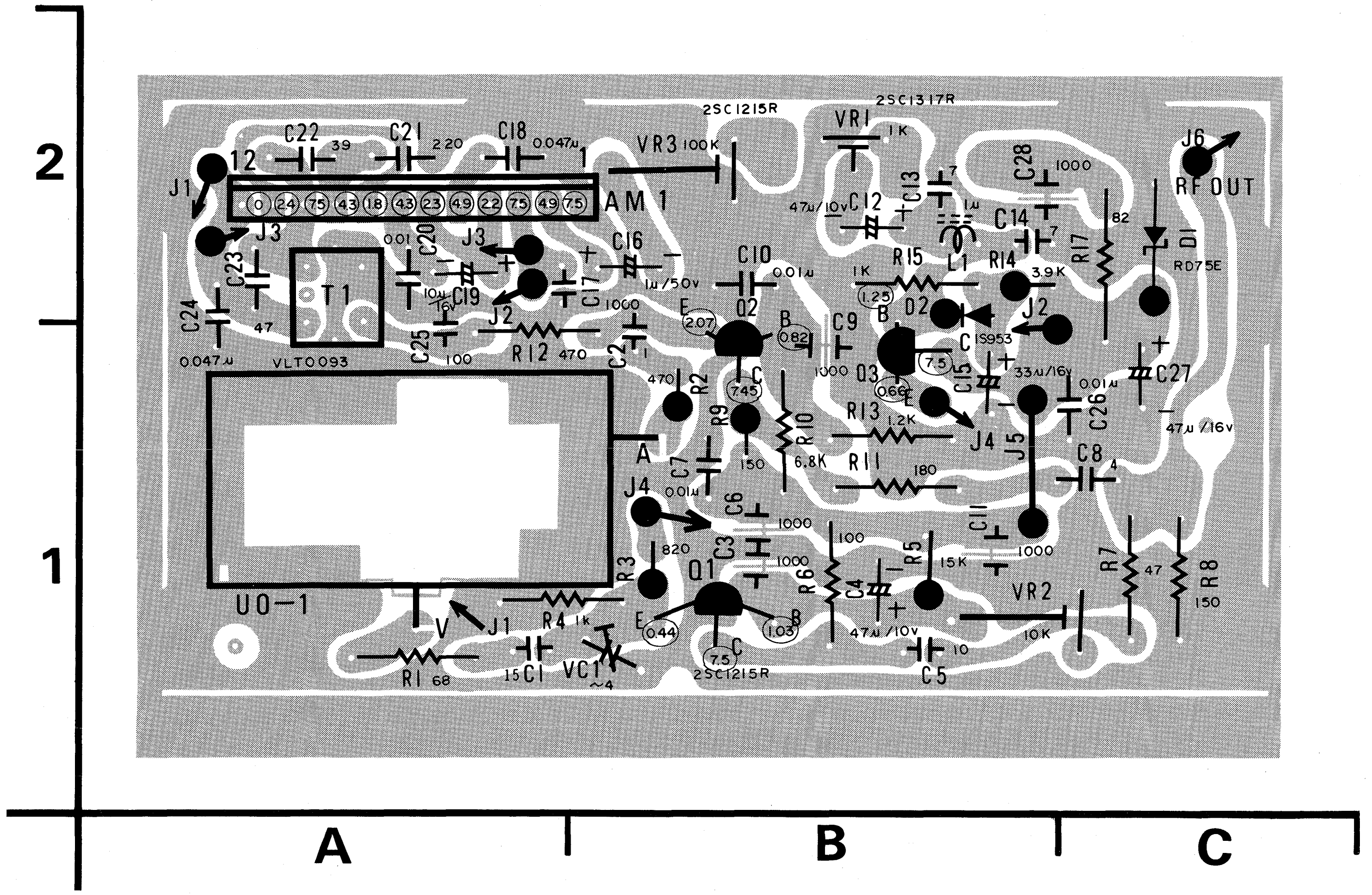
NV-8610-B

RF CONVERTER CIRCUIT BOARD



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A
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J1
J3
J2
J4
J5
J6
RF OUT
AM 1
T1
VLT0093
U0-1
VR1
VR2
VR3 100K
2SC1215R
2SC1317R
Q1
Q2
Q3
D1
RD75E
D2
1S953
L1
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
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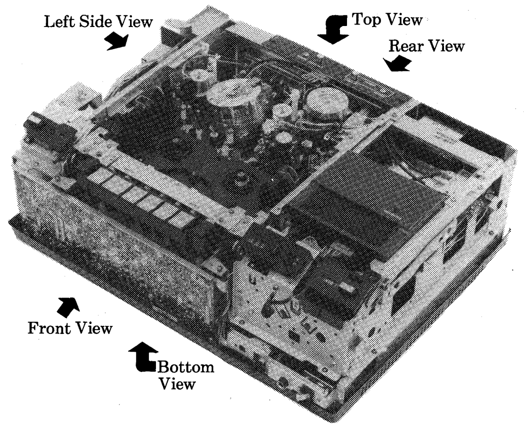
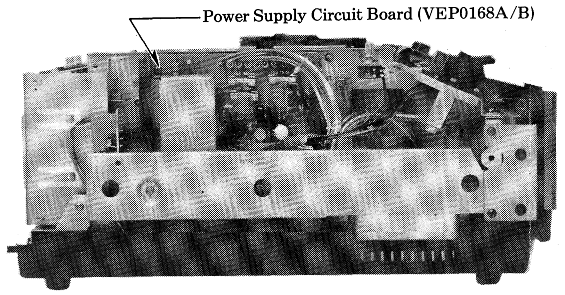
C14
C15
C16
C17
C18
C19
C20
C21
C22
C23
C24
C25
C26
C27
C28
R1 68
R2
R3
R4 1K
R5
R6
R7
R8 150
R9
R10
R11
R12 470
R13 1.2K
R14
R15
R17
VC1

CIRCUIT BOARDS LOCATION



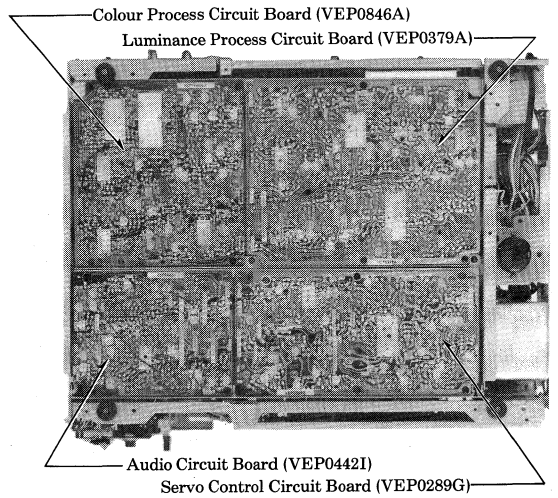
Left Side View
Top View
Rear View
Front View
Bottom View

LEFT SIDE VIEW



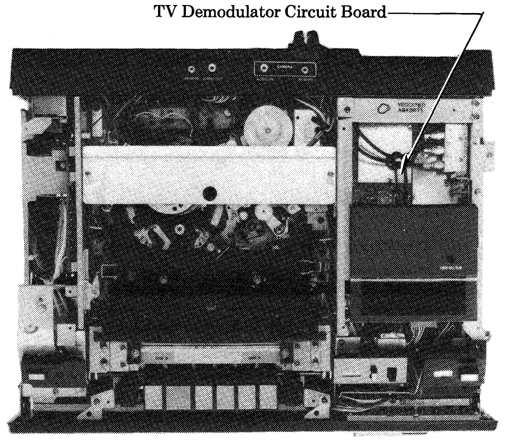
Power Supply Circuit Board (VEP0168A/B)

BOTTOM VIEW



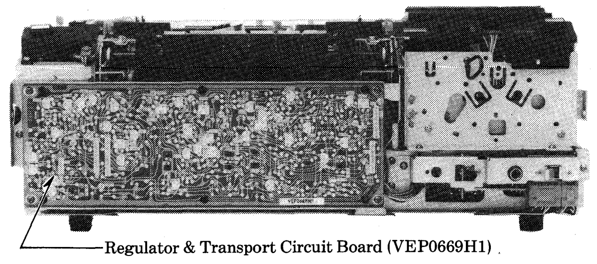
Colour Process Circuit Board (VEP0846A)
Luminance Process Circuit Board (VEP0379A)
Audio Circuit Board (VEP0442I)
Servo Control Circuit Board (VEP0289G)

TOP VIEW



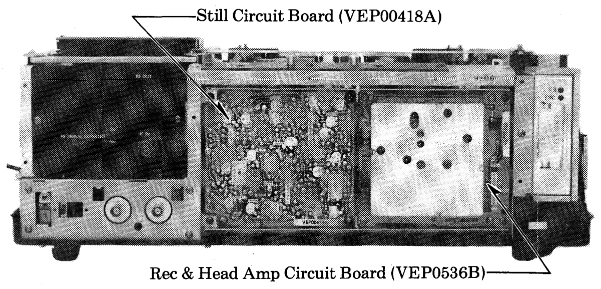
TV Demodulator Circuit Board

FRONT VIEW



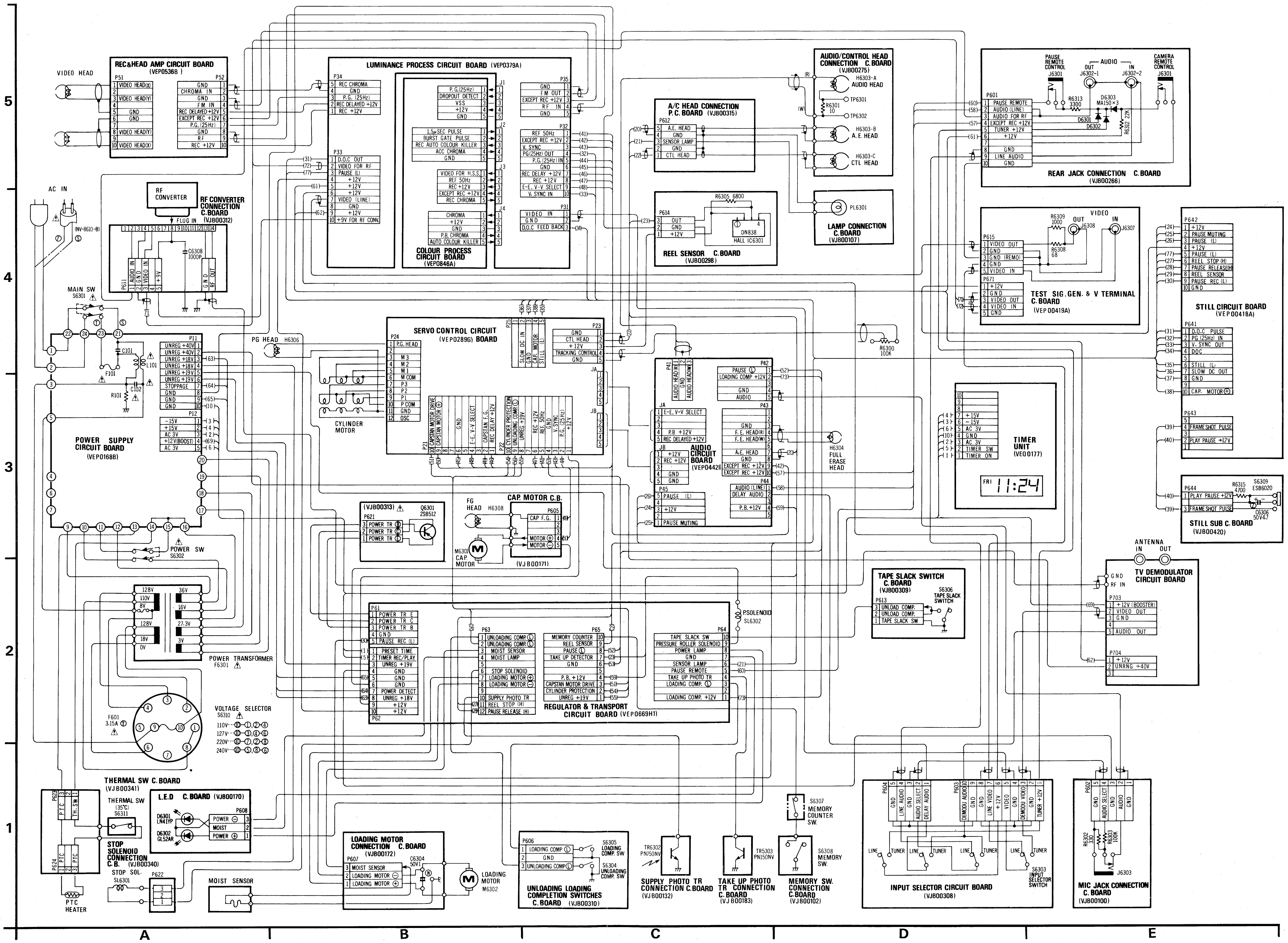
Regulator & Transport Circuit Board (VEP0669H1)

REAR VIEW



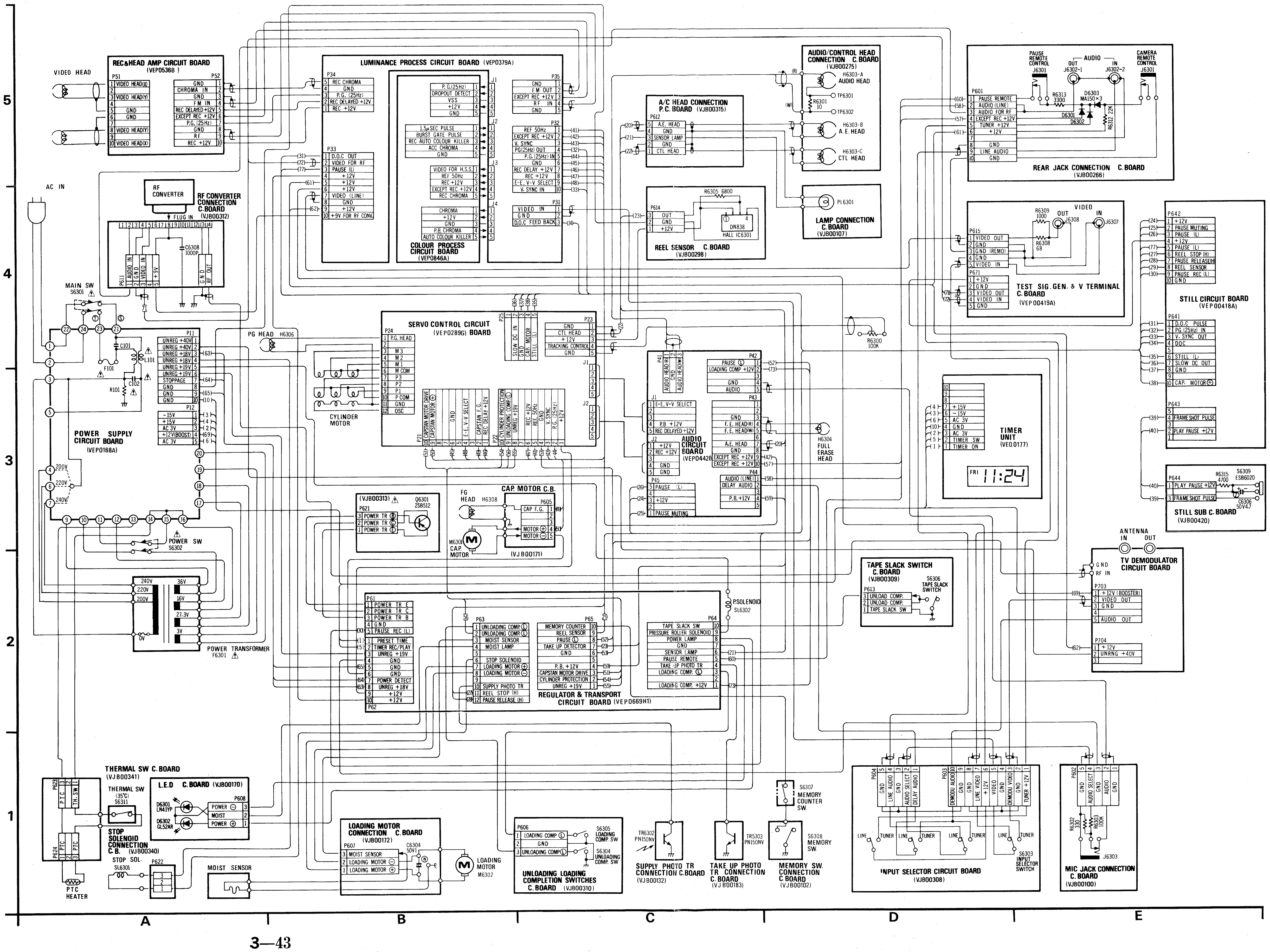
Still Circuit Board (VEP00418A)
Rec & Head Amp Circuit Board (VEP0536B)

NV-8600-E/NV-8600-B INTERCONNECTION SCHEMATIC DIAGRAM



REC&HEAD AMP CIRCUIT BOARD (VEP0536B)
VIDEO HEAD
LUMINANCE PROCESS CIRCUIT BOARD (VEP0379A)
COLOUR PROCESS CIRCUIT BOARD (VEP0846A)
AUDIO/CONTROL HEAD CONNECTION C.BOARD (VJB00275)
A/C HEAD CONNECTION P.C.BOARD (VJB00315)
REAR JACK CONNECTION C.BOARD (VJB00266)
RF CONVERTER
RF CONVERTER CONNECTION C.BOARD (VJB00312)
AC IN
MAIN SW S6301
REEL SENSOR C.BOARD (VJB00298)
LAMP CONNECTION C.BOARD (VJB00107)
TEST SIG.GEN. & V TERMINAL C.BOARD (VEP00419A)
STILL CIRCUIT BOARD (VEP00418A)
SERVO CONTROL CIRCUIT (VEP0289G) BOARD
PG HEAD H6306
CYLINDER MOTOR
POWER SUPPLY CIRCUIT BOARD (VEP0168B)
AUDIO CIRCUIT BOARD (VEP0442B)
FULL ERASE HEAD H6304
TIMER UNIT (VEO0177)
FRI 11:24
CAP. MOTOR C.B. (VJB00171)
FG HEAD H6308
M6301 CAP. MOTOR
POWER SW S6302
STILL SUB C.BOARD (VJB00420)
TV DEMODULATOR CIRCUIT BOARD
ANTENNA IN OUT
TAPE SLACK SWITCH C.BOARD (VJB00309)
POWER TRANSFORMER F6301
REGULATOR & TRANSPORT CIRCUIT BOARD (VEP0669H1)
P SOLENOID SL6302
VOLTAGE SELECTOR S6310
110V 127V 220V 240V
F601 3.15A
THERMAL SW C.BOARD (VJB00341)
THERMAL SW (35°C) S6311
L.E.D C.BOARD (VJB00170)
D6301 LN41YP
D6302 GL52AR
STOP SOLENOID CONNECTION C.B. (VJB00340)
STOP SOL. SL6301
PTC HEATER
MOIST SENSOR
LOADING MOTOR CONNECTION C.BOARD (VJB00172)
LOADING MOTOR M6302
UNLOADING LOADING COMPLETION SWITCHES C.BOARD (VJB00310)
SUPPLY PHOTO TR CONNECTION C.BOARD (VJB00132)
TAKE UP PHOTO TR CONNECTION C.BOARD (VJB00183)
MEMORY SW. CONNECTION C.BOARD (VJB00102)
S6307 MEMORY COUNTER SW.
INPUT SELECTOR CIRCUIT BOARD (VJB00308)
S6303 INPUT SELECTOR SWITCH
MIC JACK CONNECTION C.BOARD (VJB00100)
J6303
A B C D E
1 2 3 4 5

NV-8600-EO INTERCONNECTION SCHEMATIC DIAGRAM



REC&HEAD AMP CIRCUIT BOARD (VEP0536B)
VIDEO HEAD
LUMINANCE PROCESS CIRCUIT BOARD (VEP0379A)
COLOUR PROCESS CIRCUIT BOARD (VEP0846A)
AUDIO/CONTROL HEAD CONNECTION C.BOARD (VJB00275)
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H6304 FULL ERASE HEAD
TIMER UNIT (VEQ0177)
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STILL SUB C.BOARD (VJB00420)
(VJB00313) Q6301 2SB512
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M6301 CAP. MOTOR
POWER SW S6302
POWER TRANSFORMER F6301
ANTENNA IN OUT
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TAPE SLACK SWITCH C.BOARD (VJB00309)
PSOLENOID SL6302
REGULATOR & TRANSPORT CIRCUIT BOARD (VEP0669H1)
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L.E.D C.BOARD (VJB00170)
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J6303
A
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D
E
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ORDER NO. VRD-7904-313

Service Manual

Video Cassette Recorder

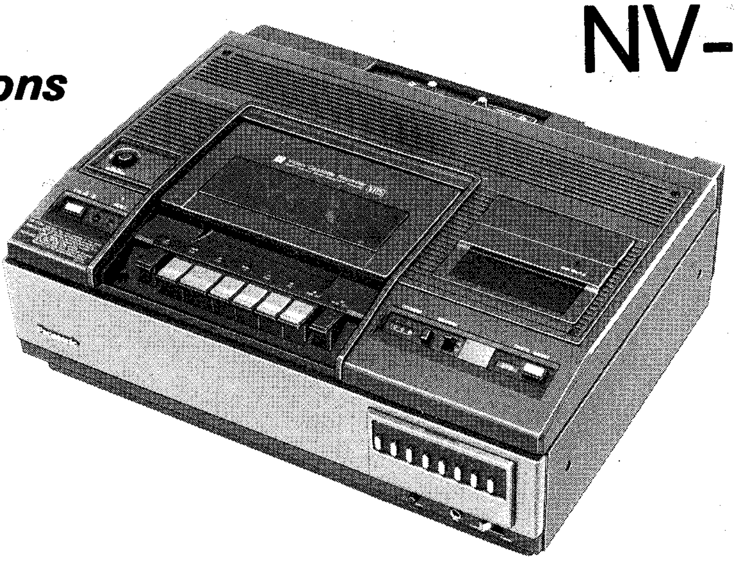
Vol. 1

Panasonic VHS

NV-8610

Summary
Technical Descriptions

HAUER & MÜLLER
Fernseh Rundfunk - Spezialwerkstatt
Stader Str. 35, 2800 BREMEN 1
Tel. 0421 / 49 83 51 - 52



SPECIFICATIONS

Power Source: NV-8610E, B
110V/127V/220V/240V AC, 50Hz
NV-8610EO: 220V AC, 50Hz
Power Consumption: Approx. 39 watts
Television System: CCIR: 625 lines, 50 fields
PAL colour signal
Video Recording System: 2 rotary heads, helical scanning, VHS system azimuth recording
Luminance: FM recordings, 3.8—4.8MHz
Colour signal: converted subcarrier phase shift recording, 627kHz
Audio Track: 1 track
Tape: Tape width 12.7mm, super high density tape
Tape Speed: 23.39mm/sec.
Video Track Width: 0.049mm
Video Head Gap Azimuth: 6°
Audio Track Width: 1.0mm
Control Track Width: 0.75mm
Record/Playback Time: 180 min. with NV-E180
FF/REW Time: Less than 4.5 min. with NV-E180
Horizontal Resolution: B/W: more than 300 lines
Colour: more than 240 lines
Audio Frequency Response: 80 to 10,000Hz
Signal-to-Noise Ratio: Video: more than 43dB
Audio: more than 43dB
Operating temperature: 5°C to 40°C
Operating Humidity: 10% to 75%
Heads: Video: 2 rotary heads
Audio/Control: 1 stationary head
Erase: 1 full track erase
1 audio dubbing erase

Inputs: Video: 1.0Vp-p, 75Ω unbalanced (BNC)
Audio: MIC −70dB, 600Ω unbalanced (M6)
LINE −20dB, 100kΩ unbalanced (BNC)
Pause remote: Short circuited (M2)
Camera remote: (M2)
TV tuner: E type: VHF ch. 2—12.
UHF ch. 21—69
EO type: VHF ch. E2—M1, M2—U9
UHF ch. 21—69
B type: UHF ch. 21—69
75Ω unbalanced (DIN)
Outputs: Video: 1.0Vp-p, 75Ω unbalanced (BNC)
Audio: LINE −6dB, 600Ω unbalanced (BNC)
RF converter: UHF ch. 36±3
75Ω unbalanced (DIN)
Weight: Approx. 16.5kg
Dimensions: Approx. 485(W)×176(H)×368(D)mm
Standard Accessories: Video cassette tape, NV-E120×1
DIN-DIN 75Ω coaxial cable, 2m long×1
Remote pause controller, NV-A181, (6m)×1
Dust cover×1
Optional Accessories: VHS cassette tape
NV-E60 (1 hr)
NV-E120 (2 hrs)
NV-E180 (3 hrs)
B/W video camera, WV-460E
(Extension cable and wide-angle adaptor lens are also available.)
Portable PAL colour camera, WV-3300E

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

INTRODUCTION

This Service Manual contains technical information which will allow service technicians to understand and service the Panasonci PAL VHS Video Tape Recorder Model NV-8610.
The NV-8610 has many special features including extended recording time of up to 3 hours, simplified and reliable new tape loading method, a directly driven head cylinder, a rugged and reliable aluminum die-cast chassis, and it is lightweight and very compact.
These features in addition to the basic PAL VHS Format mode the NV-8610 an ideal unit for industrial VTR applications.

FEATURES

1. **3-Hour Recording and Playback**
   The PAL VHS Format allows a recording time of up to 3 hours on a single videocassette. (180 min. blank tape: NV-E180).
2. **Direct Drive Head Cylinder**
   The Video Head Cylinder is directly driven by a special brushless DC motor. This method improves reliability and time base stability.
3. **Aluminum Die Cast Chassis**
   A die cast chassis improves overall performance and assures high reliability and longer life.
4. **Easy-to-use Operation Switches**
   These switches make the NV-8610 as easy to operate as any conventional audio cassette recorder.
5. **Automatic Stop**
   When recording or playing back or when in fast forward, the unit will automatically stop if the tape reaches its end.
   When rewinding, the unit will automatically stop at the tape beginning or the memory point.
6. **Tape Counter with Memory**
   The tape counter tells you at what point you are in the tape and can be set to stop tape rewinding at the "999" point
7. **Pause Control**
   Whit the Pause Control (NV-A181), the tape can be instantly stopped during recording or playback without unthreading the tape.
8. **Watch One Channel, Record Another**
   Because of its built-in UHF/VHF or UHF tuner, the NV-8610 can record a broadcast on one channel while allowing another channel to be viewed.
9. **Unattended Recording**
   With its built-in timer, the NV-8610 can be set to automatically start recording at any time.
10. **Playback through any Conventional TV**
    The built-in RF converter modulates the video signal so that it may be viewed on any conventional TV receiver.
11. **Still Frame**
    In Playback, when the Pause button is pressed, a still frame picture will appear.

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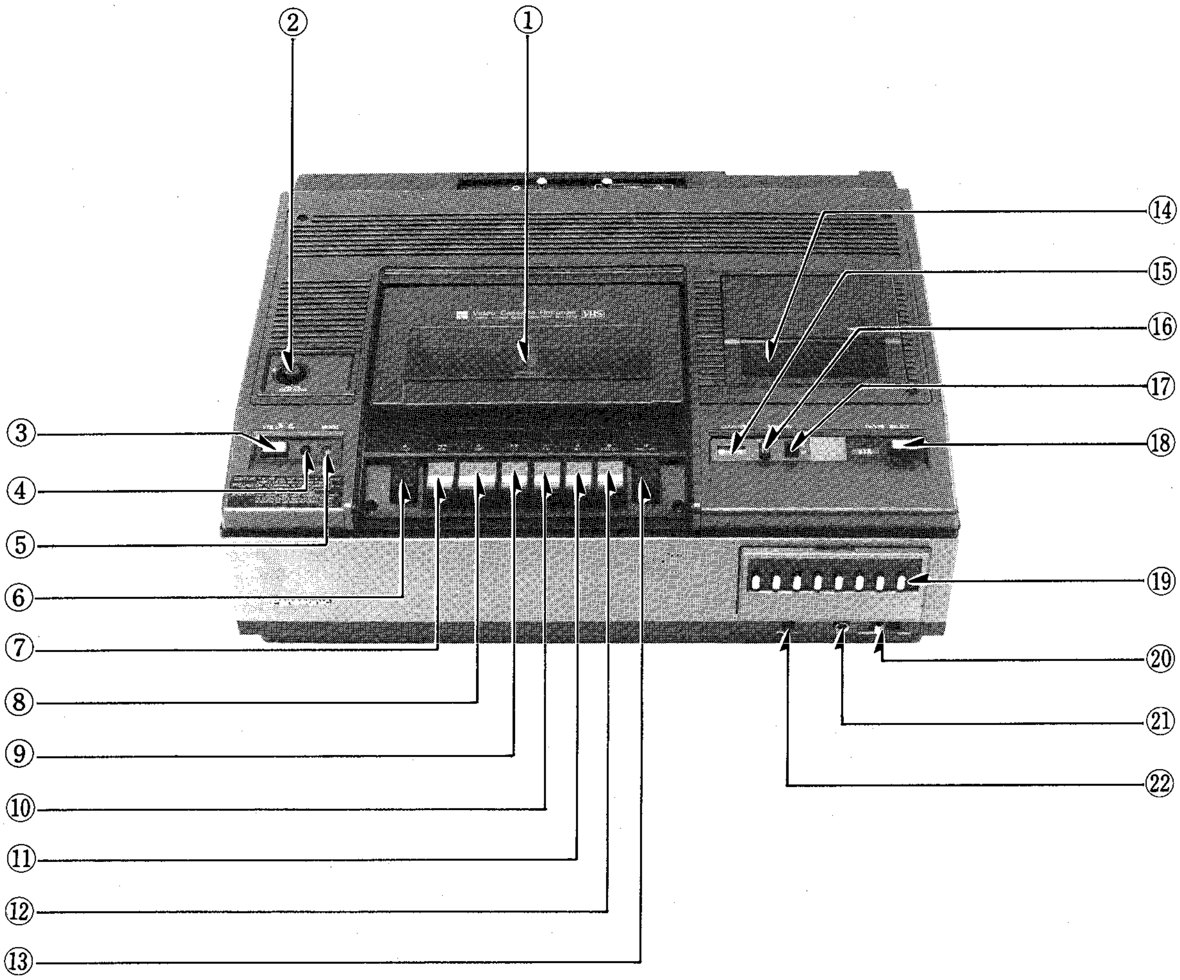
OPERATING COMPONENTS AND THEIR FUNCTIONS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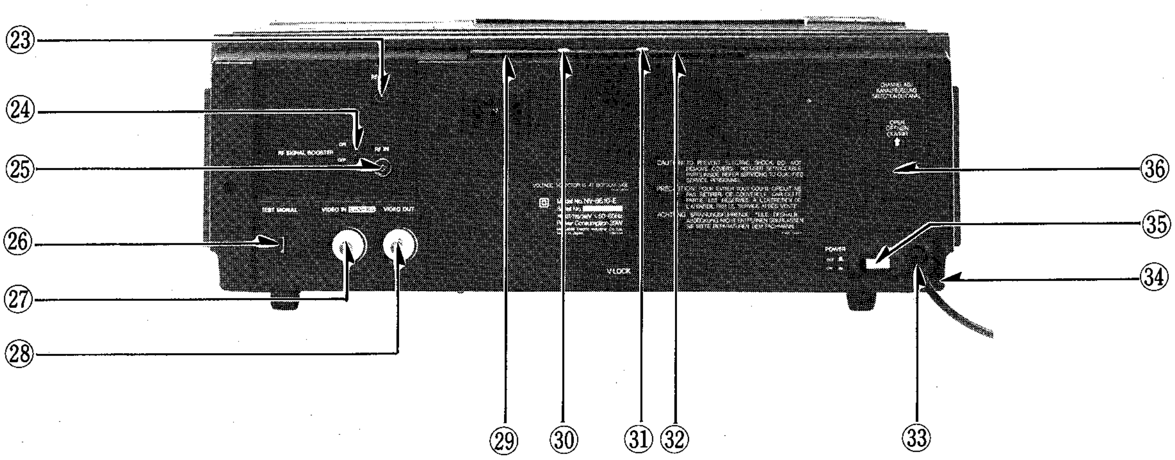
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TOP and FRONT VIEW

① **Cassette Compartment**

② **Tracking Control (TRACKING)**
This control is used to shift the playback scanning of the tape.

③ **VTR On/Off Switch (VTR)**
Switching ON provides power to the VTR, excluding Timer.

④ **Power Indicator**
This lamp illuminates when power to the recorder is turned on.

⑤ **Moisture Lamp (MOIST)**
This lamp illuminates if condensation (moisture) is present inside the recorder.

⑥ **Eject Button (EJECT)**
Press this button to raise the cassette compartment to either insert or remove a cassette. It is not possible to eject any cassette while the tape is moving, or in pause mode.

⑦ **Rewind Button (REW)**
Press this button to rewind the tape.

⑧ **Stop Button (STOP)**
Press this button to stop the Recording, Playback, Rewind, Fast Forward, Audio Dubbing, or Pause mode.

⑨ **Fast Forward Button (FF)**
Press this button to quickly move the tape in the forward direction.

⑩ **Play Button (PLAY)**
Press this button to play back a recorded tape. The tape must be stopped first.

⑪ **Record Button (REC)**
Press this button to start recording both picture and sound.

⑫ **Audio Dubbing Button (AUDIO DUB)**
During playback this button may be pressed if it is desired to record sound only onto the tape.

⑬ **Pause Button (PAUSE/STILL)**
Press this button to stop the tape movement in either the record or playback modes. A still frame picture will appear in the playback mode. Press this Button again to release pause.

⑭ **Digital Timer**
This built-in timer constantly displays the time of day and is used for unattended recording.

⑮ **Tape Counter (COUNTER)**
This is a digital counter which gives a reference as to how far the tape has moved.

⑯ **Tape Counter Reset Button**
Press this button to reset the Tape Counter ⑮ to "000".

⑰ **Memory Switch (MEMORY)**
This switch is used if it is desired to quickly find a specific portion of a recorded tape.

⑱ **TV/VTR Selector (TV/VTR SELECT)**
This switch selects one of two signals which will come out of the RF Output Connector ㉓ or Video Output Connector ㉘ on the rear panel of the recorder.

⑲ **Channel Selectors/Tuning Knobs**
Push any one of these buttons and the channel selected with the corresponding tuning knob will be received. No further tuning is necessary.

- **Tuning Knobs**
  Turn to tune to the station you want to receive, while tuning watch the TV screen.

⑳ **Input Signal Selector**
This switch is used to select between 2 incoming signals from which recordings can be made.

1) In the "TUNER" position, the signal from the built-in tuner will be recorded.
2) In the "CAMERA" position, the signal which is connected to the Video Input Connector ㉗ and Audio Input Jack ㉚ on the rear panel will be recorded.

㉑ **Microphone Input Jack (MIC)**
This is for the connection of a microphone to record sound onto the tape.

㉒ **One-Shot Still Frame Advance Button (STILL ADV.)**
During a still frame picture press this button to advance the picture by one frame at a time. (See ⑬ Pause Button.)

REAR VIEW

㉓ **RF Output Connector (RF OUT)**
This connects to the antenna terminal (COAXIAL type) of a conventional TV receiver. The cable prepared as a standard accessory is used for the connection between the recorder and the TV set.

㉔ **RF Signal Booster Switch (RF SIGNAL BOOSTER)**
This switch is for use to amplify the reception of the VHF and /or UHF antenna signals.

㉕ **RF Input Connector (RF IN)**
This is where the external antenna is connected to the recorder. The connector is a type "COAXIAL".

㉖ **Test Signal Switch (TEST SIGNAL)**
This switch is for use to tune the VHS RF output channel on the TV receiver.

㉗ **Video Input Connector (VIDEO IN)**
For connection of a video camera or other input video signal to be recorded.

㉘ **Video Output Connector (VIDEO OUT)**
For direct connection to a video monitor or another video recorder if desired. Not used with a conventional TV receiver.

㉙ **Camera Remote Control Jack (CAMERA REMOTE)**
This connector accepts a signal from the optional video camera which is operated away from the recorder and allows the recorder to pause, thus instantly stopping the recording if it is so desired. This is not effective during playback.

㉚ **Audio Input Jack (AUDIO IN)**
This connector accepts the audio signal from the optional video camera to enable the recorder to record the audio portion.

㉛ **Audio Output Jack (AUDIO OUT)**
The audio signal from either the recording source, or the playback audio is present at this connector.

㉜ **Remote Control Jack (REMOTE)**
By connecting the remote control switch here, the recorder may be paused by remote control (standard accessory) in both the Recording and Playback modes.

㉝ **AC Power Cord**

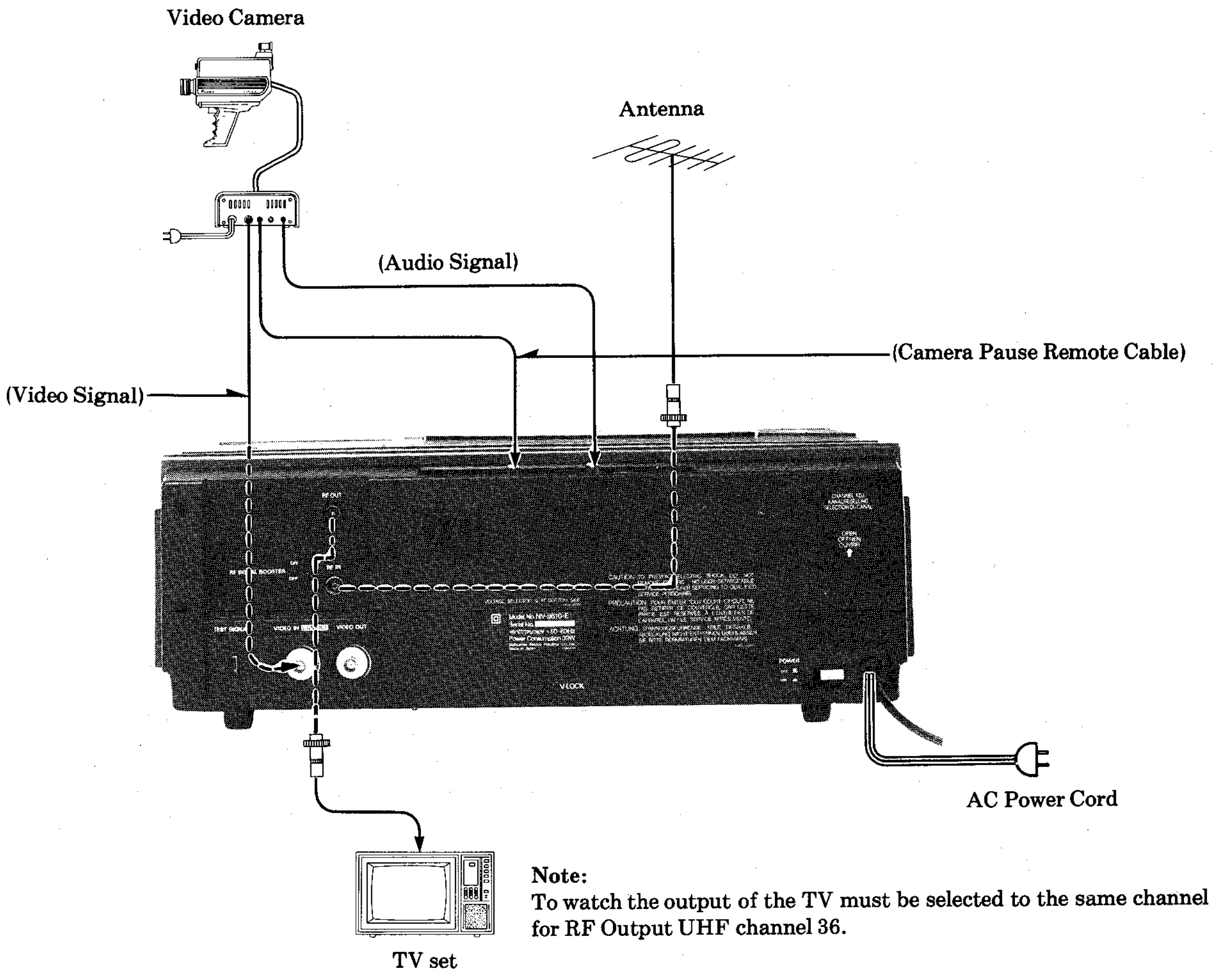
㉞ **Voltage Selector (VOLTAGE SELECT)**
Be sure to select the local voltage by turning the selector to view the voltage indication in the small window. Voltage Indication: 110, 127, 220, 240 V, AC.

Note:
The Power Off/On Switch ㉟ must always be in "OFF" position prior to starting any voltage setting.

㉟ **Power Off/On Switch (POWER)**
Switching on applies power to the recorder. To switch off this unit completely, set the Power Off/On Switch to the "OFF" position.

㊱ **RF Converter Slot**
This slot has the RF converter inside the recorder. The RF converter enables the VHS to be used with a conventional TV receivers.

CONNECTIONS



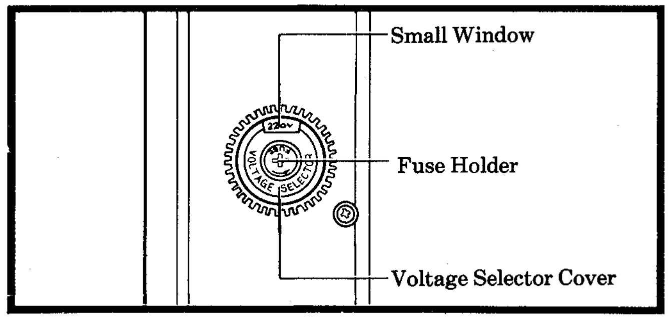
Note:
To watch the output of the TV must be selected to the same channel for RF Output UHF channel 36.

Setting the Selector Switch

VOLTAGE SELECTOR

Type NV-8610-E and NV-8610-B
NV-8610 recorder is preset to 220V or 240V at the factory.
Type NV-8610-EO*
NV-8610-EO has no voltage selector and can be used 220V only.
Before connecting to the power supply, assure that the selector on the bottom should be selected to the same voltage as your local power supply. NV-8610 can be used on either 110, 127, 220 or 240V AC.
To adjust the voltage setting proceed as follows:

1. Turn the fuse holder by using a thin driver.
2. Pull out the voltage selector cover and replace it to view your appropriate voltage indication in the small window.

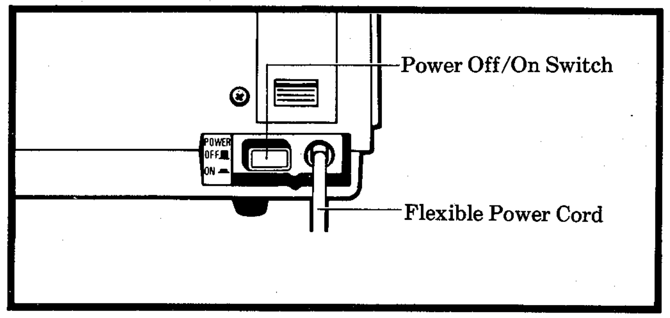


Bottom of the recorder

* **Note:**
NV-8610-EO has voltage selector terminal in Power supply Circuit (VEP0168A).
NV-8610-EO is preset to 220V. But, as your local power supply, NV-8610-EO can be used on either 200, 220 or 240V AC.
If you change the voltage selector terminal, please refer to the Power Supply Circuit Board (VEP0168A) diragram (Page 3-12).
200V.........terminal④
220V.........terminal⑥
240V.........terminal⑦

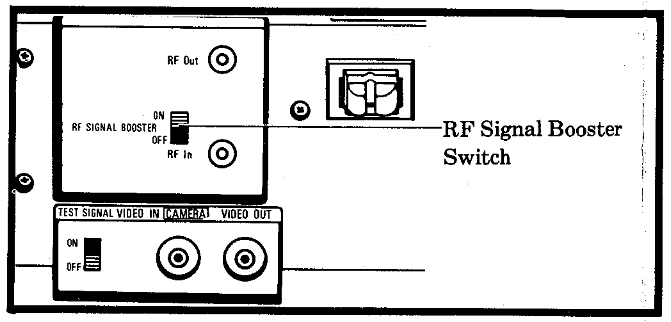
POWER OFF/ON SWITCH

This latch type Power Off/On Switch ㉟ is located on the rear side beside power cord of the recorder.
Setting this switch to the "OFF" position removes all applied power from the recorder including the video timer.
Switching ON or OFF the recorder section is performed with the front panel VTR On/Off Switch③.



RF SIGNAL BOOSTER SWITCH

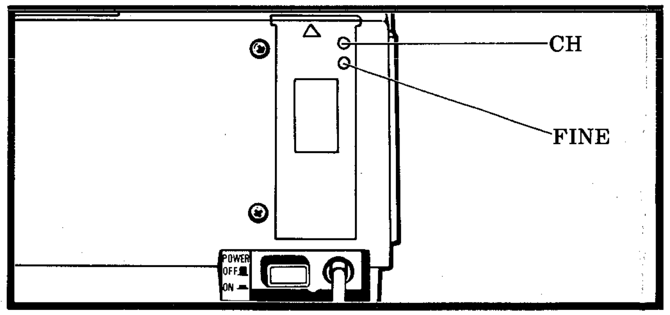
This RF Booster Switch is located on the rear panel beside the antenna terminal.
It is intended for use where the local television transmission signal is low.
If the reception is poor, set this switch to the "ON" position.
If the signal strength is high and the stripped pattern appears at the top of the picture on the TV screen, set the switch to the "OFF" position.



RF CONVERTER

On the rear panel of the recorder, a slot is located, having a converter for playing back the signal from the recorder NV-8610 onto the TV receiver.
If the playback picture shows a patterning interference effect, it may be that the RF converter playback channel requires careful adjustment as follows:

1. Remove the RF Converter cover.
2. Insert a thin screwdriver in the hole marked with "CH" on the RF Converter and turn it slowly and then retune the TV receiver.
3. If the clear picture should not appear on the TV screen, adjust "FINE" on the RF Converter and retune the TV channel until you can find the clear picture on the TV receiver.



RF Output Channel

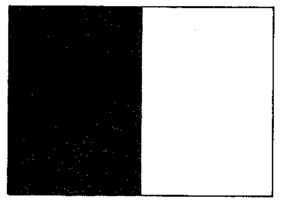
SETTING YOUR TV TO THE RF OUTPUT CHANNEL

An RF converter built into the NV-8610 will allow you to playback Video Home System signals into your TV receiver. For this purpose those signals can be viewed through an unused broadcast channel.

- NV-8610 is set to UHF 36 (±3) prior to shipment.

Tuning Procedure

1. Switch on the TV receiver and select a spare button which will be used for the VHS playback, in some cases this may be marked A/V or VCR.
2. Switch on the NV-8610 Power Off/On Switch ㉟ and VTR On/Off Switch③.
3. Select "VTR" on the TV/VTR Selector Switch ⑱.
4. Set the Test Signal Switch ㉖ to the "ON" position, and adjust the TV receiver fine tuning until the pattern shown below is received. This tuning point can be channel 36 (±3) so tune slowly in this region.



Cs, set the Test Signal Switch ㉖ to the "OFF" position.
Your TV receiver is now ready to receive the RF output signal from the NV-8610 Video Cassette Recorder.

Notes:

- When Test Signal Switch ㉖ is in the "ON" position, the Black and White pattern will be seen on the TV receiver.
  When Test Signal Switch ㉖ is in the "OFF" position, you can use the recorder normally.
- Whenever using the NV-8610 with the TV/VTR Selector Switch ⑱ in the "VTR" position it is necessary to always ensure that your TV receiver is set to the VHS playback button as selected in No. 1 above.

VTR Tuner Setting

Your VHS Video Cassette Recorder can receive broadcast programmes via an inbuilt push-button tuner. This eight button tuner will allow you to select any broadcast channel, transmitting television programmes. When making a recording or just viewing (via your RF output channel on the TV) ensure that the Input Signal Selector Switch ⑳ is always in the "TUNER" position.
For optimum performance from the NV-8610 push button tuner ensure that the tuner compartment cover (see Figure) is completely closed during operation. With the tuner compartment cover closed the Automatic Fine Tuning (AFT) circuitry will assure the best performance and stability available from the selected channel.

Tuner Setting

1. Push in the Channel Selector Button, that you wish to pretune. (See Fig. A or B.)
2. Switch the NV-8610 ON and select "VTR" by the TV/VTR Selector Switch ⑱. Ensure that the Input Signal Selector Switch ⑳ is in the "TUNER" position.
3. Switch your TV receiver ON and select the pretuned RF output channel on the TV receiver's channel selector.
   Open the NV-8610 tuner compartment cover and firstly select the band for the channel that you require, (see Fig. B) by moving the band switch, applicable to the push button previously selected, into the appropriate position (see Table).
   A band select switch (see Fig. B) is located under each of the eight red fine tuning knobs which individually operate in conjunction with each push button.
   For your reference the band required can be determined from this simple table.
   Note:
   This step is for use NV-8610-E and NV-8610EO ONLY.
4. Turn the red tuning knob, (see Fig. A or B) whilst observing the TV receiver screen and tune for the desired channel. After having adjusted the tuning knob for optimum picture quality close the tuner compartment cover until the cover is latched shut.

NV-8610-B

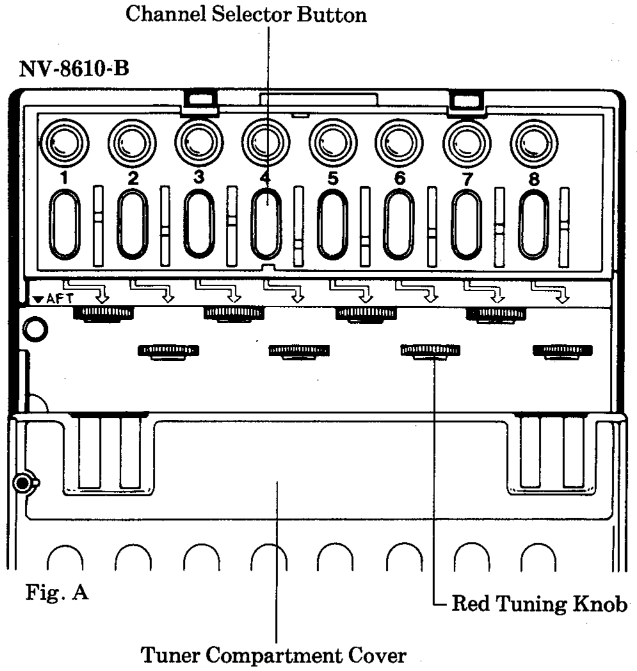


Fig. A

Table

	VHF		UHF
	VL	VH	
NV-8610-B	—— ——	——	21 ——— 69
NV-8610-E	2 —— 4	5 —— 12	21 ——— 69
NV-8610-EO	E2 —— M1	M2 —— U9	21 ——— 69

NV-8610-E
NV-8610-EO

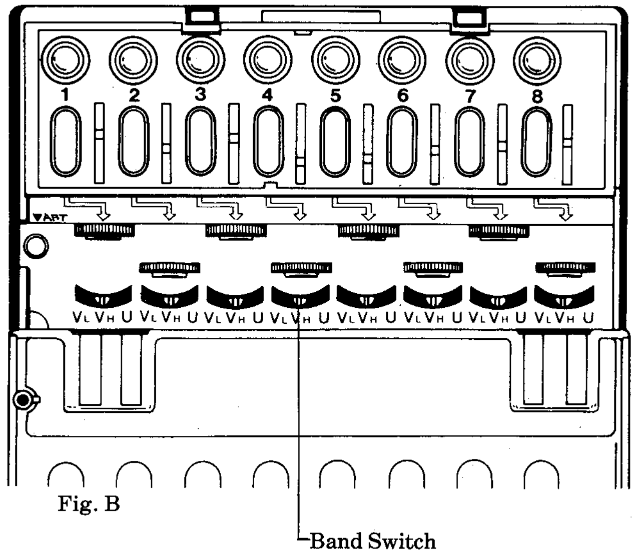

1
2
3
4
5
6
7
8
AFT
VL VH U VL VH U VL VH U VL VH U VL VH U VL VH U VL VH U VL VH U
Band Switch

Fig. B

Use of the Digital Timer

TIMER CONTROL AND THEIR FUNCTIONS

- **Time Mode Selector**

  This is a 3-position switch (return to centre type) which is used to observe the setting of the timer. "PROGRAM" position is used to programme the timer for unattended recording.
  "NORMAL" position is used for normal operation of the recorder.
  "CLOCK" position is used for setting time of day.

- **ON CHECK/OFF Buttons**

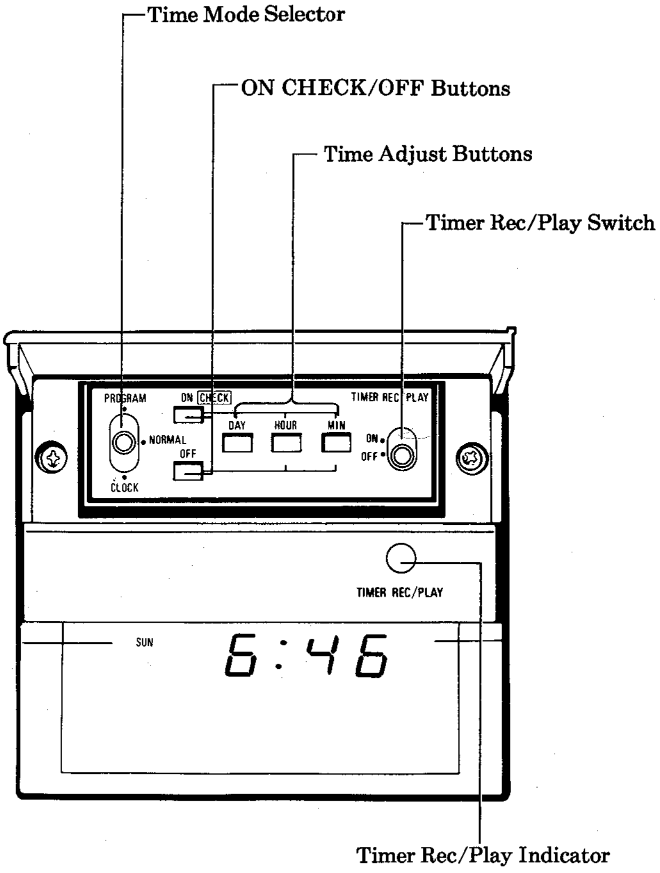
  These buttons are used for the timer setting when unattended recording will be desired.
  ON CHECK Button
  This button is used to programme starting time or check the timer preparation.
  OFF Button
  This button is used to programme stop time for unattended recording.

- **Time Adjust Buttons**

  "DAY" button is used to select the day when unattended recording will take place. The display will appear as follows:
  SUN, MON, TUE, WED, THU, FRI and SAT.
  "HOUR" button is used to set hours on the video timer.
  "MIN" button is used to set minutes on the video timer.

- **Timer Rec/Play Switch**

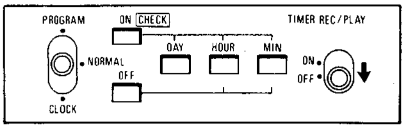
  This enables the timer to turn the recorder ON when the desired time is reached. When the switch is in the "ON" position, the timer has control over the recorder.


Time Mode Selector
ON CHECK/OFF Buttons
Time Adjust Buttons
Timer Rec/Play Switch
PROGRAM
ON CHECK
TIMER REC/PLAY
DAY
HOUR
MIN
NORMAL
OFF
ON
OFF
CLOCK
TIMER REC/PLAY
SUN
6:46
Timer Rec/Play Indicator

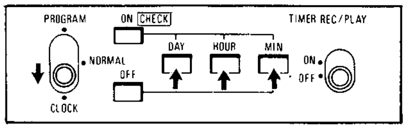
SETTING THE CLOCK

Check, to be sure, that the Timer Rec/Play Switch is set to the "OFF" position.
Move the Time Mode Selector to the "CLOCK" position, and then hold it. Press the "DAY" button to set the correct present day, and press the "HOUR" button to set the correct hour. When the button is first depressed the time advance will be slow, then speed up for easier setting. Hold button to advance fast. Next, press the "MIN" button to set the correct minute. (MIN does not affect HOUR.)
Note:
Make sure that the time indication is not counting at this junction.
Return the Time Mode Selector to the "NORMAL" position.

1.


PROGRAM
ON CHECK
TIMER REC/PLAY
DAY
HOUR
MIN
NORMAL
OFF
ON
OFF
CLOCK

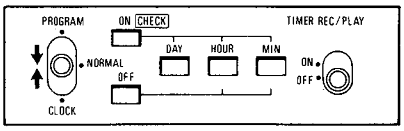
2.

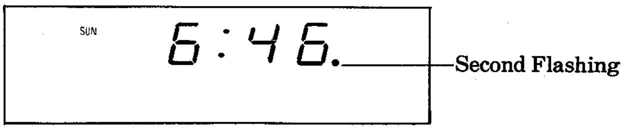

PROGRAM
ON CHECK
TIMER REC/PLAY
DAY
HOUR
MIN
NORMAL
OFF
ON
OFF
CLOCK

- **Precise Time Setting to the Exact Second**

  Advance the time display by one minute ahead of the exact correct present time. Holding the Time Mode Selector in the "CLOCK" position, and then return it to the "NORMAL" position when a time bell is heard. Each minute will be precisely changed to the correct time.

3.

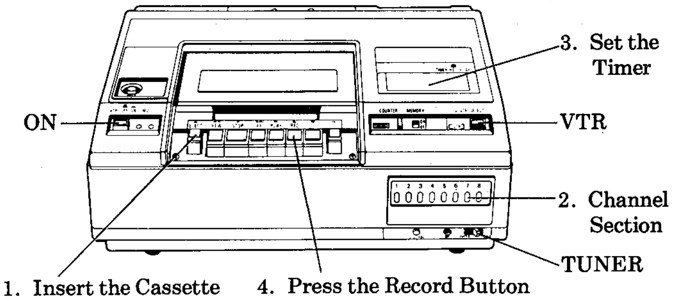

PROGRAM
ON CHECK
TIMER REC/PLAY
DAY
HOUR
MIN
NORMAL
OFF
ON
OFF
CLOCK


SUN
6:46.
Second Flashing

Unattended Recording

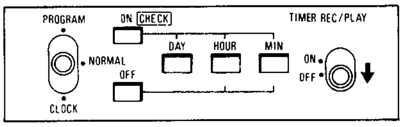
OPERATION PROCEDURE

Set the switches on the recorder as shown here.

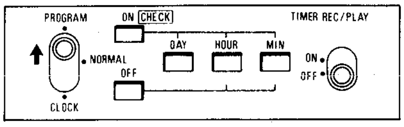

3. Set the Timer
ON
VTR
2. Channel Section
TUNER
1. Insert the Cassette
4. Press the Record Button

- **Set the Timer as Follows:**

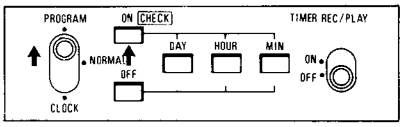
(1) Be sure the Timer Rec/Play Switch is in the "OFF" position.


PROGRAM
ON CHECK
TIMER REC/PLAY
DAY
HOUR
MIN
NORMAL
OFF
ON
OFF
CLOCK

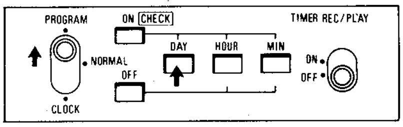
(2) Move the Time Mode Selector to the "PROGRAM" position and then hold it.


PROGRAM
ON CHECK
TIMER REC/PLAY
DAY
HOUR
MIN
NORMAL
OFF
ON
OFF
CLOCK

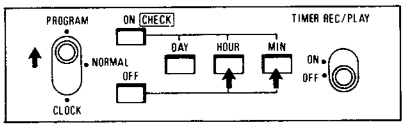
(3) Press the "ON CHECK" button to programme the starting time.


PROGRAM
ON CHECK
TIMER REC/PLAY
DAY
HOUR
MIN
NORMAL
OFF
ON
OFF
CLOCK

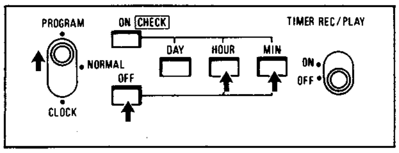
(4) Select the day you want unattended recording to occur by pressing the "DAY" button. The day position of the digital display will be shown in the following order:
SUN, MON, TUE, WED, THU, FRI and SAT.


PROGRAM
ON CHECK
TIMER REC/PLAY
DAY
HOUR
MIN
NORMAL
OFF
ON
OFF
CLOCK

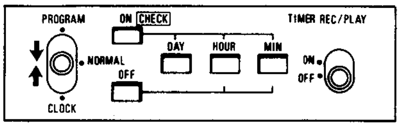
(5) Following a similar procedure as described previously for setting the time of day, select the recording start time by using the "HOUR" and "MIN" buttons.


PROGRAM
ON CHECK
TIMER REC/PLAY
DAY
HOUR
MIN
NORMAL
OFF
ON
OFF
CLOCK

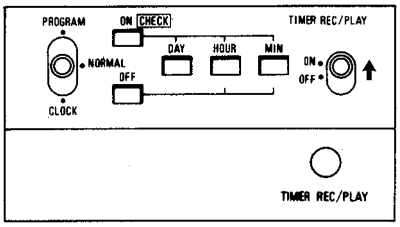
(6) Press the "OFF" button and then select the recording stop time by using the "HOUR" and "MIN" buttons.


PROGRAM
ON CHECK
TIMER REC/PLAY
DAY
HOUR
MIN
NORMAL
OFF
ON
OFF
CLOCK

(7) Return the Time Mode Selector to the "NORMAL" position.

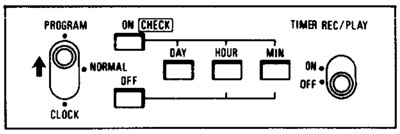

PROGRAM
ON CHECK
TIMER REC/PLAY
DAY
HOUR
MIN
NORMAL
OFF
ON
OFF
CLOCK

(8) Set the Timer Rec/Play Switching to the "ON" position. Timer Rec/Play Indicator Lamp will illuminate and the Power Indicator goes off.
Note:
When the Timer Rec/Play Switch is in the "ON" position, the recorder can not be operated manually.


PROGRAM
ON CHECK
TIMER REC/PLAY
DAY
HOUR
MIN
NORMAL
OFF
ON
OFF
CLOCK
TIMER REC/PLAY

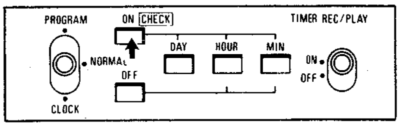
- **Unattended Recording at the Same Time Every Day**

To record at the same time every day, press and hold the "DAY" button until all of the days of the week appear. And then select desired start and stop times. A full week recording can be made.


PROGRAM
ON CHECK
TIMER REC/PLAY
DAY
HOUR
MIN
NORMAL
OFF
ON
OFF
CLOCK

- **To Change Programming**

To change programming, move the Time Mode Selector to the "PROGRAM" position and reprogramme your desired time. The programs previously set will in this way be automatically cleared.


PROGRAM
ON CHECK
TIMER REC/PLAY
DAY
HOUR
MIN
NORMAL
OFF
ON
OFF
CLOCK

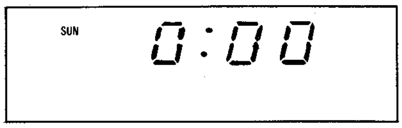
- **To Check Programming**

To check programming, press the "ON CHECK" button. The digital display will show the start time and after 2 seconds stop time automatically.

- **Power Failure**

Notes Concerning Time Setting

- Whenever the Power Off/On Switch ㉟ first is turned to ON, or if there is a power failure, the time indication will flash because of the power interruption. Reset the clock and timer to the correct time once again and reprogramme.
- Time changes or setting can not be made when the Timer Rec/Play Switch is in the "ON" position.
- When not using the recorder for unattended recording, be sure that the Timer Rec/Play Switch is in the "OFF" position.



VHS-PRINCIPLE OF OPERATION

Basic Video Tape Recording

To understand the VHS format, it is wise to first review the basic principles of video tape recording.

Like audio tape recording, video information is stored on magnetic tape by means of a small electromagnet, or head. The two poles of the head are brought very close together but they do not touch. This creates magnetic flux to extend across the separation (gap), as shown: Fig. 1.

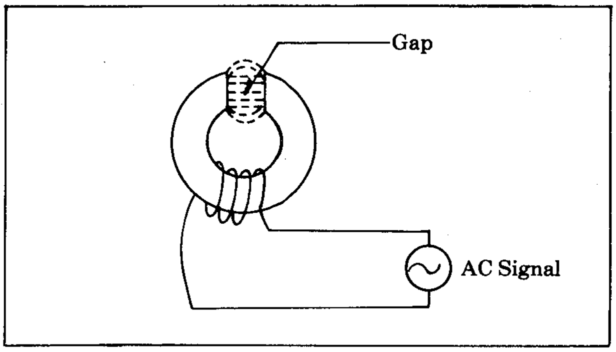


Fig. 1

If an AC signal is applied to the coil of the head, the field of flux will expand and collapse according to the rise and fall of the AC signal.

When the AC signal reverses polarity, the field of flux will be oriented in the opposite direction and will also expand and collapse. This changing field of flux is what accomplishes the magnetic recording. If this flux is brought near a magnetic material, it will become magnetized according to the intensity and orientation of the field of flux. The magnetic material used is oxide coated (magnetic) tape. Using audio tape recording as an example, if the tape is not moved across the head, just one spot on the tape will be magnetized and will be continually re-magnetized. If the tape is moved across the tape, specific areas of the tape will be magnetized according to the field of flux at any specific moment. A length of recorded tape will therefore have on it areas of magnetization representing the direction and intensity of the field of flux. For instance:

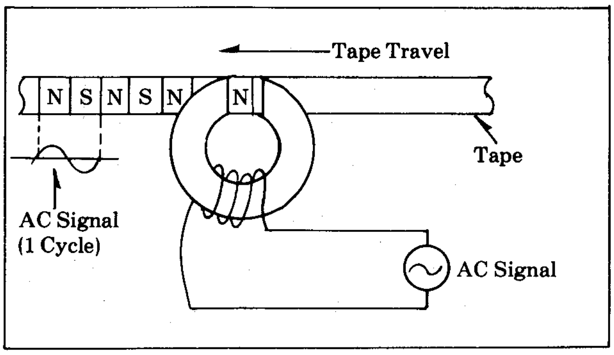


Fig. 2

The tape will have differently magnetized regions, which can be called North (N) and South (S), according to the AC signal. When the polarity of the AC signal changes, so does the direction of magnetization on the tape, as shown by one cycle on the AC signal (see Fig. 2). If the recorded tape is then moved past a head whose coil is connected to an amplifier, the regions of magnetization on the tape will set up flux across the head gap which will in turn induce a voltage in the coil to be amplified. The output of the amplifier, then is the same as the original AC signal. This is essentially what is done in audio recording, with other methods for improvement like bias and equalization.

There are some inherent limitations in the tape recording process which do effect video tape recording, so they will be examined now. As shown in Fig. 3, the tape has North and South magnetic fields which change according to the polarity of the AC signal. What if the frequency of the AC signal were to greatly increase?

If the speed of the tape past the head (head to tape speed) is kept the same, the changing polarity of the high frequency AC signal would not be faithfully recorded on the tape, as shown:

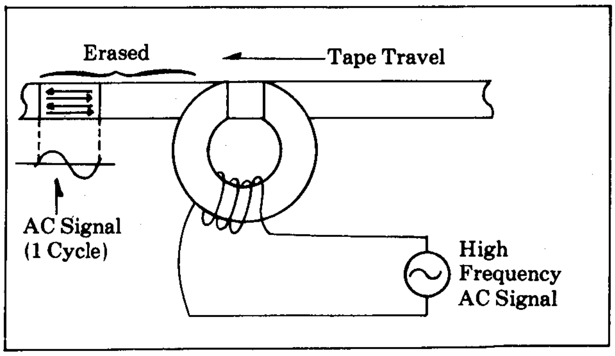


Fig. 3

As the high frequency AC signal starts to go positive, the tape will start to be magnetized in one direction. But the AC signal will very quickly change its polarity, and this will be recorded on much of THE SAME PORTION of the tape, so North magnetic regions will be covered by South magnetic regions and vice versa. This results in zero signal on the tape, or self-erasing. To keep the North and South regions separate, the head to tape speed must be increased. (See Fig. 3.)

When recording video, frequencies in excess of 5 MHz may be encountered. Through experience, it is found that the head to tape speed must be in the region of 10 meters per second in order to record video signals.

The figure of 10 meters per second was also influenced by the size of the head gap. Clearly, the lower the head to tape speed, the easier it is to control that speed. If changes in head gap size were not made, the necessary head to tape speed would have been considerably higher. How the gap size influences this can be explained by Fig. 4.

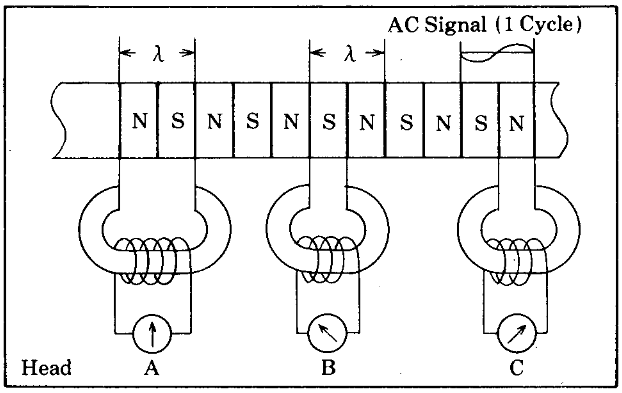


Fig. 4

Assume a signal is already recorded on the tape. The distance on the tape required to record one full AC signal cycle is called the RECORDED WAVELENGTH or λ. Head A has a gap width equal to λ. Here, there is both North and South oriented magnetization across the gap.

This produces a net output of zero since North and South cancel. Heads B and C have a maximum output because there is just one magnetic orientation across their gaps.
Maximum output occurs in heads B and C thereforce, because their gap width is 1/2 λ. (Heads B and C would also work if their gap width is less than 1/2 λ.) The same is also true for recording. The maximum useable (no self-erasing) transfer of magnetic energy to the tape occurs when the gap width, G, can be expressed as.

$$G \leq \frac{\lambda}{2}$$

The RECORDED WAVELENGTH, can be expressed as:

$\lambda = \frac{V}{f}$ where V is the head to tape speed and f is the frequencies to be recorded.

So, $G \leq \frac{V}{2f}$, as V increases, G is also allowed to increase for the same MAXIMUM frequency. Conversely if G is made very small, V is allowed to be reduced.

In practice, G can be made as small as (and smaller than) 1μm (1×10^{-6} meters) and this puts V in the area of 10 meters per second.
A head to tape speed of 10 meters per second is a very high speed, too high in fact to be handled accurately by a reel to reel tape machine of reasonable size. Also, tape consumption on a high speed reel to reel machine is tremendous.
The method employed in video recording is to move the video heads as well as the tape. If the heads are made to move fast, across the tape, the linear tape speed can be kept very low.
In 2-head helical video recording (the only format which will be discussed here) the video heads are mounted in a rotating drum or cylinder, and the tape is wrapped around the cylinder. This way, the heads can scan the tape as it moves. When a head scans the tape, it is said to have made a TRACK. This can be seen in Fig. 5.
In 2-head helical format, each head, as it scans across the tape will record one TV field, or 312.5 horizontal lines. Therefore, each head must scan the tape 25 times per second to give a field rate of 50 fields per second.

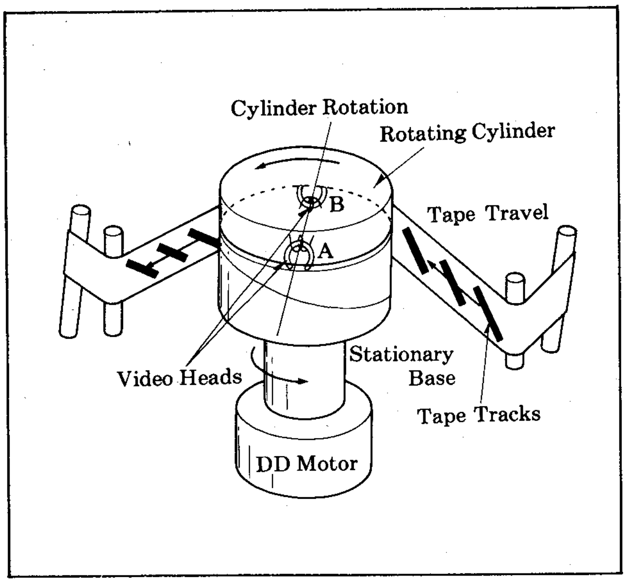


Fig. 5

The tape is shown as a screen wrapped around the head cylinder to make it easy to see the video head. There is a second video head 180° from the head shown in front. Because the tape wraps around the cylinder in the shap of a helix (helical) the video tracks are made as a series of slanted lines. Of course, the tracks are invisible, but it is easier to visualize them as lines. The two heads "A" and "B" make alternate scans of the tape.

An enlarged view of the video tracks on the tape can be shown in Fig. 6.

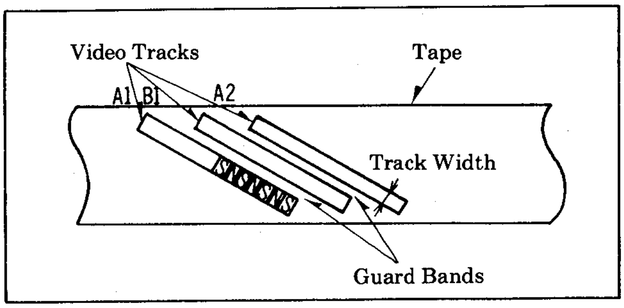


Fig. 6

Refer to Fig. 6. The video tracks are the areas of the tape where video recording actually takes place. The guard bands are blank areas between tracks, preventing the adjacent track's crosstalk from appearing on the track where the video head is tracing.
There is one more point about video recording which will be discussed here. Magnetic heads have the characteristic of increased output level as the frequency increases. Then, as determined by the gap width, the maximum output occurs at approximately $G = \frac{V}{2f}$.
In practice, the lower frequency output of the heads is boosted in level to equal the level of the higher frequencies. This process, as also used in audio applications, is called equalization.
Video frequencies span from DC to about 5 MHz. This represents a frequency range of about 18 octaves. 18 octaves is too far a spread to be handled in one system (one machine). For instance, heads designed for operation at a maximum frequency of 5 MHz will have very low output a low frequencies. Since there is 6 dB/octave attenuation, 18 × 108 dB difference appears. In practice this difference is too great to be adequately equalized. To get around this, the video signal is applied to an FM modulator during recording. This modulator will change its frequency according to the instantaneous level of the video signal.
The energy of the FM signal lies chiefly in the area from about 1 MHz to 10 MHz, just three octaves. Heads designed for use at 10 MHz can still be used at 1 MHz, because the output signal can be qualized. Actually speaking, heads are designed for use upto about 5 MHz. Therefore, some FM energy is lacked but it does not aftect the playback video signal much, because information incleded in high frequency region does not affect so much.
Upon playback, the recovered FM signal must be equalized then demodulated to obtain the video signal.

CONVERTED SUBCARRIER DIRECT RECORDING METHOD

The one method of colour video recording that will be discussed here is the converted subcarrier method. In order to avoid visible beats in the picture caused by the interaction of the colour (chrominance) and brightness (luminance) signals, the first step in the converted subcarrier method is to separate the chrominance and luminance portion of the video signal to be recorded. The luminance signal, containing frequencies from DC to about 5 MHz, is then FM recorded, as previously described. The chrominance portion, containing frequencies in the area of 4.43 MHz is down-converted in frequency in the area of 627 kHz. Since there is not a large shift from the center frequency of 627 kHz, this converted chrominance signal is able to be recorded directly on the tape. Also note that the frequencies in the area of 627 kHz are still high enough to allow equalized playback. In practice, the CONVERTED CHROMINANCE signal and the FM signals are mixed and then simultaneously applied to the tape. Upon playback, the FM and converted chrominance signals are separated. The FM is demodulated into a luminance signal again. The converted chrominance signal is reconverted back up in frequency area of 4.43 MHz. The chrominance and luminance signals are combined which reproduces the original video signal.

VHS Format

1. HIGH DENSITY RECORDING SYSTEM

A. Elimination of the guard band

In VHS format, it is possible to record or playback up to 3 hours of material. And in addition, the size of the reel of tape (although inside the cassette) is reduced, not increased as might be expected. This increase in recording time and reduction in tape reel size represents an increase in recording density; the tape is more densely filled with information.

To achieve greater recording density, the guard bands between the video tracks on the tape have been reduced to zero. This way, there is no wasted space.

Because the video tracks actually meet, there is danger of interference in playback because the video head, when scanning a particular video track, will also receive some signal from the adjacent track. See Fig. 6.

CCIR STANDARD I TYPE
Tape Speed 16.3 cm/sec

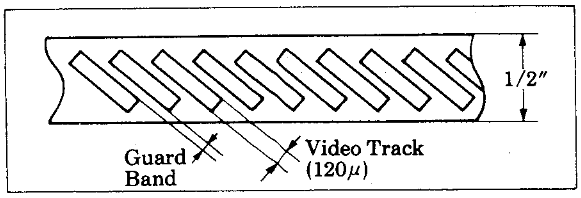


Fig. 7

STANDARD CASSETTE U-TYPE
Tape Speed 9.5 cm/sec

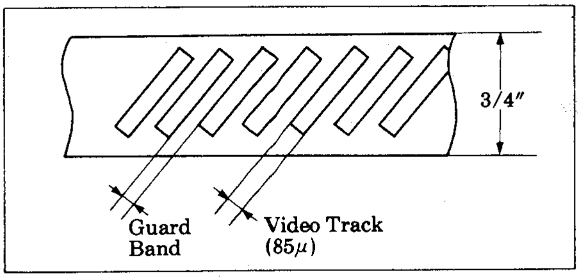


Fig. 8

PAL VHS STANDARD
Tape Speed 2.339 cm/sec

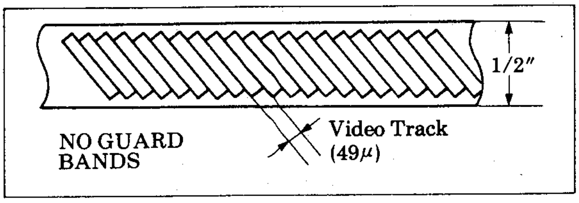


Fig. 9

As can be seen by the comparison of different tape formats with VHS format, the elimination of the guard bands greatly increases recording density. But again, the lack of guard band also presents a problem. In playback, when a video head scans a particular track, it will inadvertently pick up some information from an adjacent track. This would cause objectionable interference. To overcome this, Azimuth Recording is employed. This technique is covered later.

B. Reduction of Track Width

The elimination of the guard band is a significant help in increasing the recording density. Of equal significance is the reduction of the video track width. Since the track themselves consume less tape space, more information can be stored because more tracks will fit onto a particular length of tape.

Refer to Fig. 7, 8, 9:

A typical video track width in other helical applications is in the area of 100μm (microns, 1×10^{-6} meters). In VHS, the track width is 49μm. This means that the actual size of the video head must be reduced, because the head size determines the track width.

C. Reduction of Tape Speed

In order to move the smaller video tracks close enough together so that adjacent tracks meet, the tape speed must be reduced. The reduction of tape speed will mean that less tape moves past the video head cylinder per unit time, so therefore, the unchanged speed of the rotating video heads will place the video tracks closer together. Linear tape speed in VHS is 2.339 cm/sec.

2. NEW VIDEO HEADS

A. The Need for New Video Heads

We have already discussed the reduced track width. This reduction requires the use of a smaller video head. Just making them smaller does not make them better. With less of actual head material to work with, the magnetic properties of the head suffers. To offset this a change in the head material is in order. Because the VHS recorder is designed to be small, a reduction in the size of the head cylinder was called for.

A reduction in the size (diameter) of the head cylinder changes the head to tape speed Remember, the head to tape speed the high frequency recording capability of the head. To offset this problem, the head gap size was reduced.

As mentioned before, Azimuth Recording is utilized in VHS. The heart of the Azimuth Recording process is in the video heads themselves. This requires still another change in head design.

B. Hot Pressed Ferrite

The use of Hot Pressed Ferrite as video head material in VHS helps to improve the characteristics of the smaller head. The Hot Pressed Ferrite also has uniform domain orientation which further improves the head characteristics. It has been proven in many tests that the use of Hot Pressed Ferrite produces a superior video head.

C. Head Gap

1. Width

As explained, the need for smaller head gap size became apparent. In VHS, the video heads have gap widths of a mere 0.3μm (0.3×10^{-6} meters).

This is quite a contrast with ordinary video heads used in other helical applications whose gap widths are typically in the area of 1μm.

2. Azimuth

Azimuth is the term used to define the left to right tilt of the gap if the head could be viewed straight on.

In previous VTR applications the azimuth was always set to be perpendicular to the direction of the head travel across the tape, or more simply, the video track. Fig. 11 helps explain this.

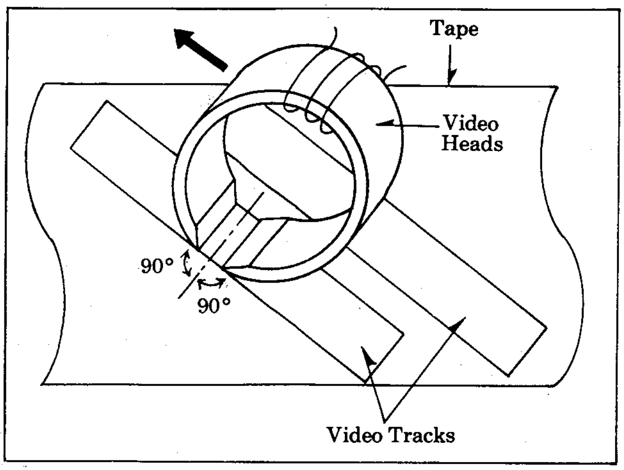

Tape
Video Heads
90°
90°
Video Tracks

Fig. 10

Fig. 10 shows that the gap is perpendicular to (90°) the head's movement. We can think of this standard as a perfect azimuth of 0°.
In VHS, the video heads have a gap azimuth other than 0°. And more, one video has a different azimuth from the other. The 2 values used in VHS are azimuth of +6° and −6°. Refer to Fig. 11.

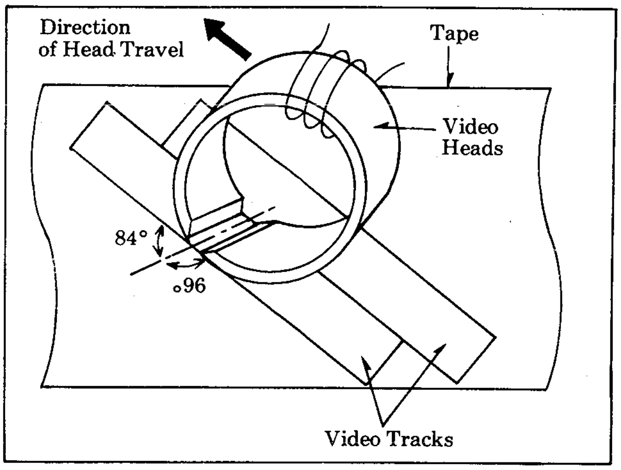

Direction of Head Travel
Tape
Video Heads
84°
96°
Video Tracks

Fig. 11

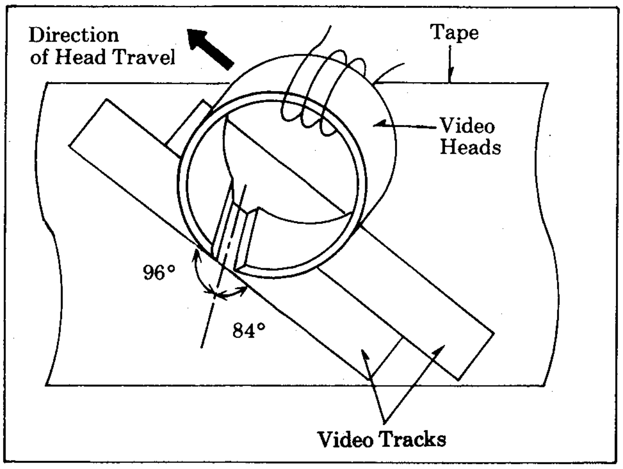

Direction of Head Travel
Tape
Video Heads
96°
84°
Video Tracks

Fig. 12

These heads make the VHS format different from most other VTR formats. Exactly how the azimuth's of ±6° helps to keep out adjacent track interference is explained next.

3. AZIMUTH RECORDING

Azimuth Recording is used in VHS to eliminate the interference or crosstalk picked up by a video head. Again, because adjacent video tracks touch, or crosstalk, a video head when scanning a track will pick up some information from the adjacent track. The azimuths of the head gaps assure that video head "A" will only give an output when scanning across a track made by head "A". Head "B", therefore, only gives an output when scanning across a track made by head "B". Because of the azimuth effect, a particular video head will not pick up any crosstalk from an adjacent track. Let's examine this more closely.
In Fig. 13, we can see the video tracks with not to scale North and South magnetized regions in them.

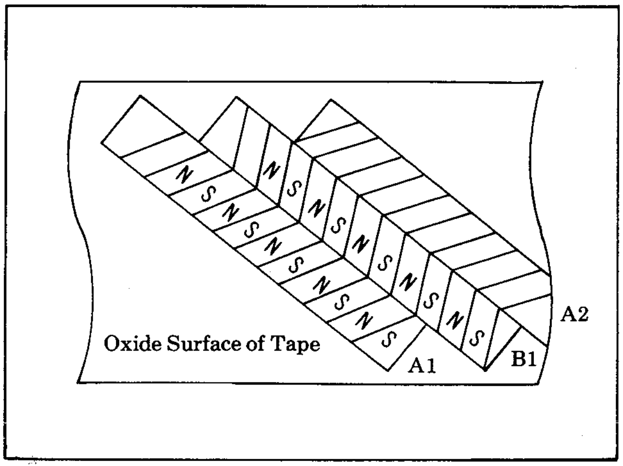

N
S
Oxide Surface of Tape
A1
B1
A2

Fig. 13

It can also be seen that these N or S regions are not perpendicular to the track, they have −6° azimuth in tracks A1, A2; and +6° azimuth in tracks B1, B2.
If we take track A1 and darken the N regions, it becomes easier to see.

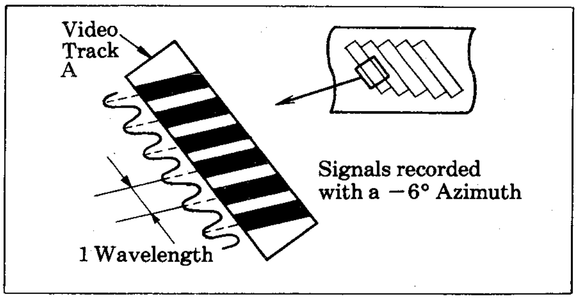

Video Track A
Signals recorded with a −6° Azimuth
1 Wavelength

Fig. 14

If Fig. 14, we see the information on track A, made by head "B". Imagine now that head "A" is going to playback this track, by superimposing the head over the track. Clearly, the gap fits exactly over the N and S regions, so that at any moment there is either an N region or an S region or an N to S (or S to N) transition across the gap. This produces maximum output in head "A". Now, visually superimpose the "B" head over the track.
Here there are N and S regions across the gap at the same time, at any given moment. Remember that simultaneous N and S regions across the gap cause cancellation, and therefore no output. Looking at Fig. 15, we can see that the gap width is equal to 1/2 the recorded wavelength. Recall that this occurs at the highest frequency which is to be recorded.
So therefore, the azimuth effect works at these high frequencies.

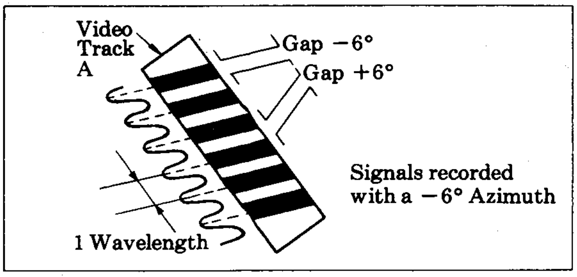


Fig. 15

But what happens at lower frequencies? In Fig. 16, we see a diagram similar to Fig. 15, except the the recorded wavelength is longer, which represents a lower frequency.

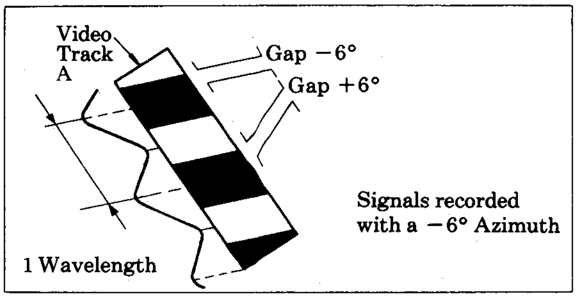


Fig. 16

Again, visually superimpose the heads over the track. Head "A" is the same as before. But look at head "B". There is much less cancellation across the gap, and its output is close to that of head "A". Therefore, we see where the azimuth effect is dependent on frequency. The higher the frequency, the better the azimuth effect. The lower the frequency, the lower the separation by azimuth effect.

The azimuth effect, then, can be used for the high fresquency FM or luminance portion of the signal to be recorded, but in the frequency region of the converted subcarrier, a new method is used to eliminate adjacent channel crosstalk.

4. STILL MODE PLAYBACK

In order to achieve almost noiseless playback pictures in the STILL mode, the width of videoheads in NV-8610 is slightly altered with respect to predecessor models. While both videoheads are wider than 49μ, the recordings made on NV-8610 are still perfectly interchangeable with other VHS VTRs whose videoheads are standard 49μ.

The videoheads in NV-8610 measures as follows:

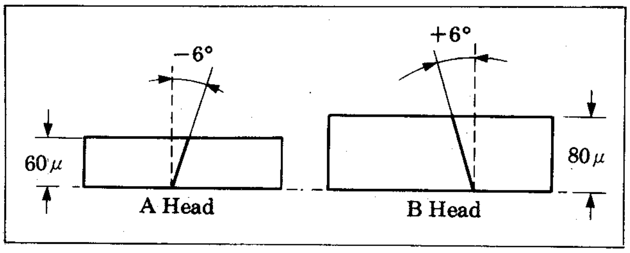


Fig. 17

When recordings are made, each head writes its own distinctive (in azimuth) pattern on the tape corresponding to a single field (1/50 sec). Since during this time, the lateral movement of the tape is 49μ, the succeeding videohead records a pattern partially over the pattern which was recorded 1/50 sec prior to this. The oxide particles in this area of overlap are re-oriented due to head azimuth difference between sucessive scans. (See Fig. 18).

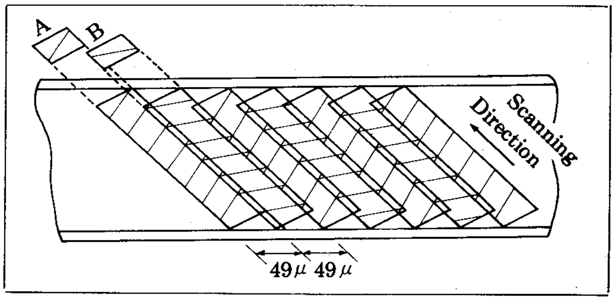


Fig. 18

The final video tracks are thus 49μ wide. They are not separated by a guardband, and the recorded pattern has a relative azimuth of 12° between adjacent tracks. This pattern follows the VHS standard.

Since the heads are slightly wider than the recorded pattern, the heads pass over two adjacent tracks during playback but because of the 12° azimuth difference do not pick up the signal from the track which the other head recorded.

In the STILL mode, when the relative angle between the recorded pattern and head trace changes, each head may pick up not only its own track but also adjacent tracks on either side. Since each head is able to pick up some part of the signal it recorded, an almost noiseless picture results.

5. STILL MODE IN VHS

The relationship between the monitor picture and videohead position on the scanner mechanism in a VTR is shown in Fig. 19.

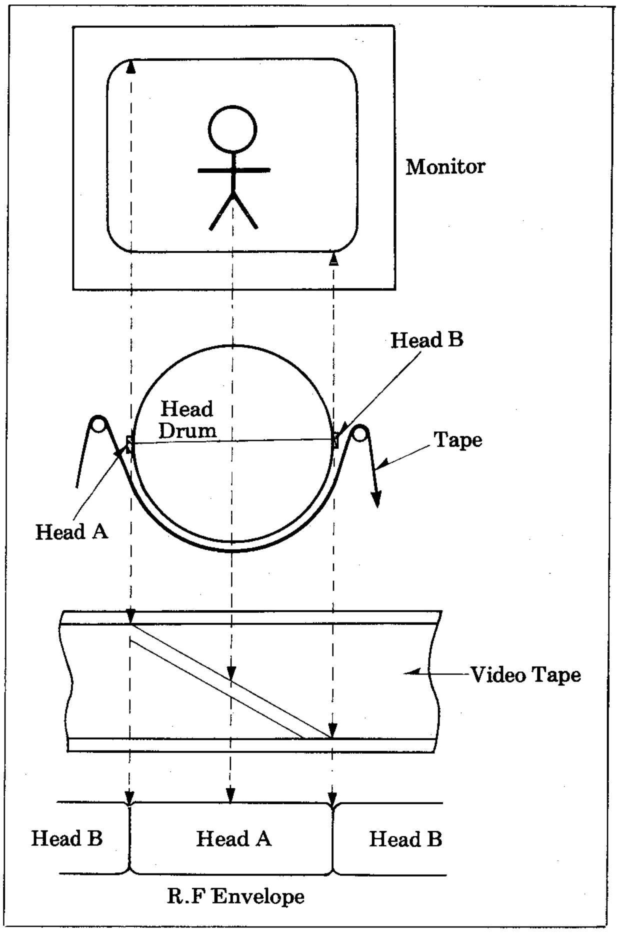
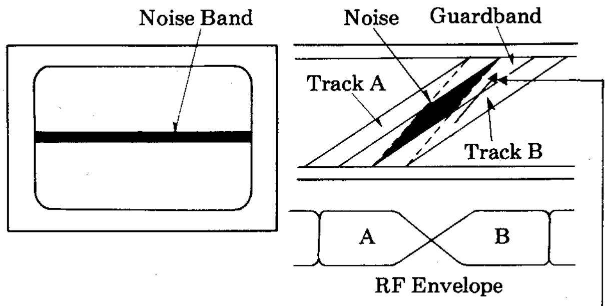


Fig. 19

Notice that the top of the picture is produced by the signal which head A picks up from the tape when it first makes contact with it. Conversely, the bottom of the picture is produced by head A when it is about to leave the tape (turning ccw).
Similarly, the pattern recorded on the tape can be related to head position on the scanner. The RF envelope from the output of the head-amplifier can also be related to the pattern on the tape, scanner, and actual picture on the monitor.
In a normal VTR (U-format or EIAJ-1 format for example) without azimuth recording system, the STILL picture produces a single noise band in the monitor and its relative position on the screen depends on the spot at which both videoheads cross the guardband (which generates noise).



Head scanning direction during STILL mode (slight angle change).

Fig. 20

In such VTRs if both videoheads are not rotating in the same plane on the scanner two noise bars are produced. This is a malfunction condition affecting tape interchangeability. To correct it one head chip is normally reposited (physically) so that only one noise bar is seen in the STILL mode.

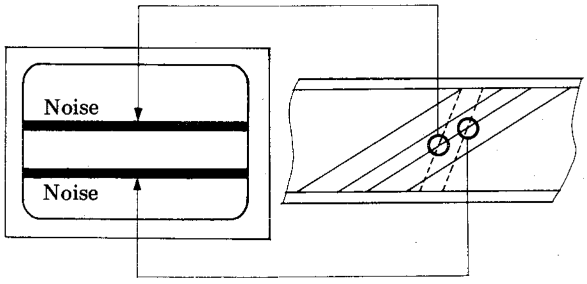


Fig. 21

In VHS models with STILL frame capability this fixing method should be avoided since the monitor may display 1 or 2 noise bars when videoheads are mounted correctly.
In VHS-type VTRs head gaps have a 6° azimuth with respect to "normal" orientation.

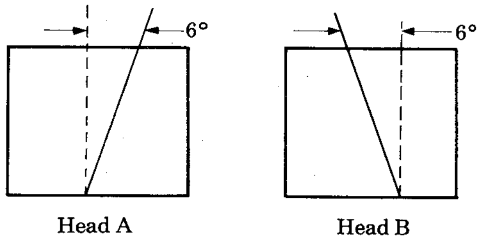
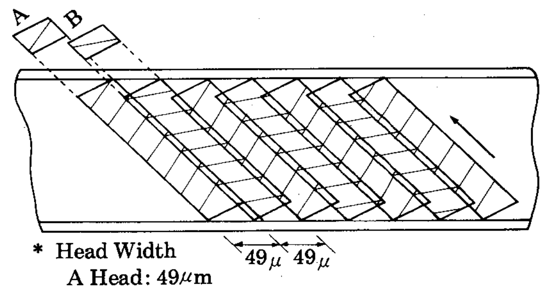


Fig. 22

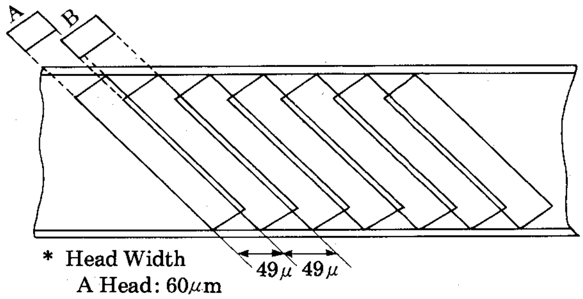
The azimuth recording method incorporated in VHS system places video tracks adjacent to one another (no guardband) during the recording process.
There is no interference during playback since each head picks up its own signal fully, but signal pickup from the adjacent track is greatly attenuated due to the 12° relative azimuth (between the recorded pattern and head gap).



* Head Width
A Head: 49μm
B Head: 49μm
* Recorded Track Width
A Track: 49μm
B Track: 49μm

Fig. 23

In the VHS models with STILL capability, such as NV-8610, the videohead chips differ in width. The B head (80μm) is wider than the A head (60μm). Neither is equal to the standard 49μm. They are mounted on the upper drum so that only the lower chip edges are in the same plane.
When a normal recording is made, slight overlap between tracks results in erasure (or re-recording) so that the final result conforms exactly to the VHS format, i.e. tracks 49μm wide with no guardband (see Fig. 24).



* Head Width
A Head: 60μm
B Head: 80μm
* Recorded Track Width
A Track: 49μm
B Track: 49μm

Fig. 24

The reason for different head chip widths is to enable VHS-format machines to have almost noiseless STILL frame capability while maintaining tape interchangeability.

1) **STILL with a Single Noise Bar**

Reduce this picture and line up with RF envelope pattern as done previously.

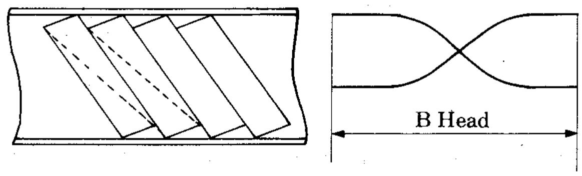


Fig. 25

Although head A picks up the signal from two A tracks the RF carriers are of opposite phase and tend to cancel out.

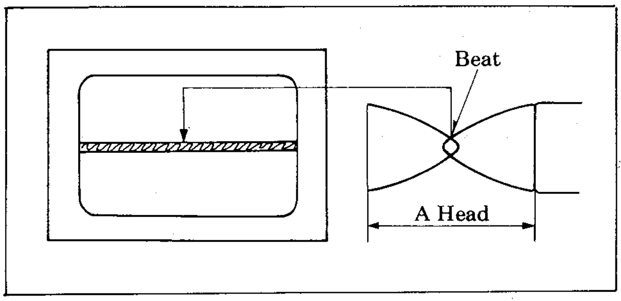


Fig. 26

2) **Still with 2 Noise Bars (Worst Condition)**

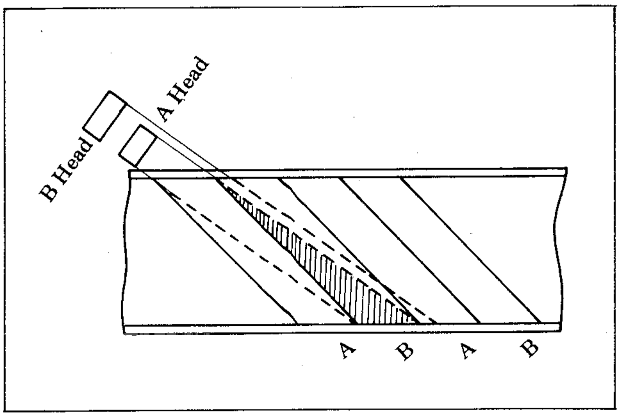


Fig. 27

B head output falls here due to RF cancellation between two B tracks.

A head output fall here due to RF cancellation between two A tracks.

Note: Although 2 noise bars would indicate videohead height difference needing adjustment (on normal VTR) don't do it. This condition is normal in VHS-format VTRs.

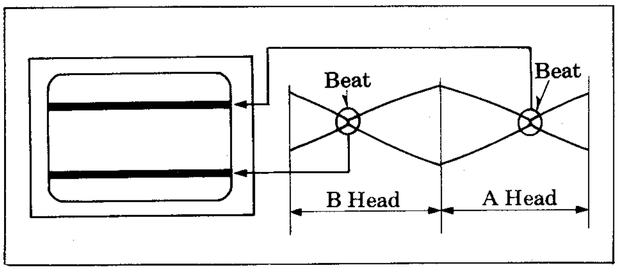


Fig. 28

3) **Still with Almost No Noise**

This is normal STILL mode picture produced on NV-8610 when either self-recorded tape is played back or any tape recorded on VHS.

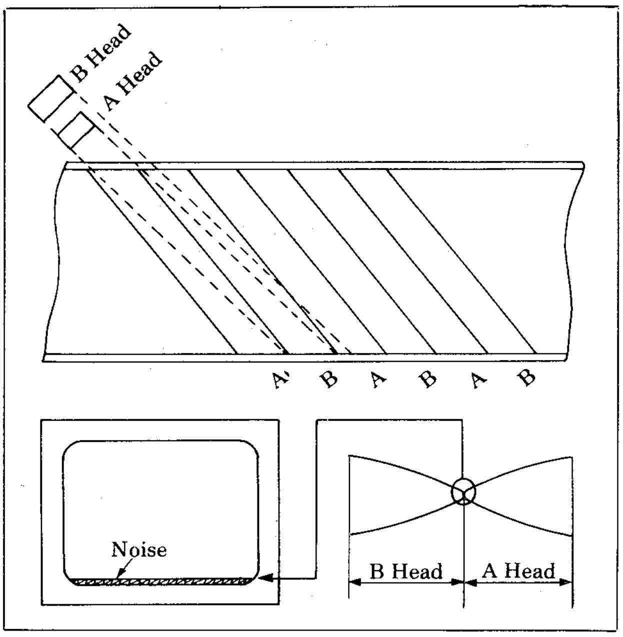


Fig. 29

If the STILL pictures exhibit a slight vertical jitter a control in the back of NV-8610 can be adjusted to eliminate it.

Inside the VTR in the STILL mode V. SYNC pulses are inserted into the outgoing video in order to reliably lock the monitor vertically. The timing of two successive pulses is offset by 1.5H on purpose in order to eliminate vertical jitter.

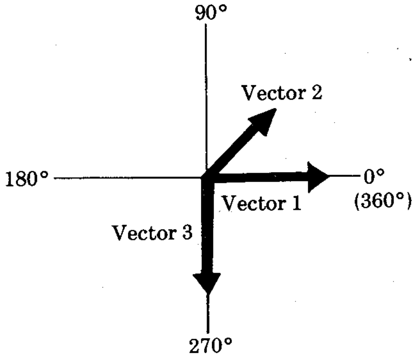
6. VHS COLOUR RECORDING SYSTEM

Because there is insignificant azimuth affect at lower frequencies, a new colour recording system must be adopted.

The fact that crosstalk occurs at lower frequencies cannot be changed, this happens right at the tape during playback. The method adopted processes the crosstalk component signals from the heads so that they are eliminated. It is important to realize that the crosstalk DOES STILL OCCUR. It is the recording/playback circuitry that performs the elimination.

In ordinary Helical VTR's using converted subcarrier direct recording, the phase of the chrominance signal is untouched, recorded directly onto the tape. The chrominance signal and its phase can be represented by vectors. Vectors graphically represent the amplitude and phase of ONE frequency. In this descussion, we will consider (for simplicity) the chrominance signal to be of one frequency. As an example of vectors, see Fig. 30.

The length any vector represents its amplitude.



Vector 1 has a phase angle of 0°
Vector 2 has a phase angle of 45°
Vector 3 has a phase angle of 270°

Fig. 30

We know that the azimuth effect will not work at the lower frequencies. And since the colour information in VHS is recorded at low-converted frequencies, a new method of colour recording was adopted.

Vector Rotation in Recording is actually a phase shift process that occurs at a horizontal rate, 15,625 Hz.

The chrominance signal can be represented by a vector, showing amplitude and phase. (↑)

In ordinary Helical Scan VTRs' the vector is of the same phase for every horizontal line, on every track:

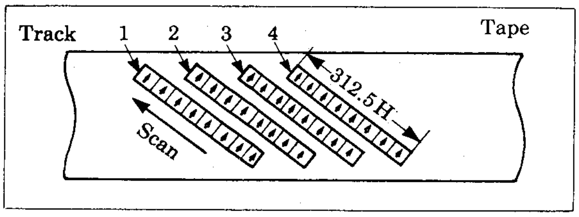

Track 1 2 3 4
Tape
312.5H
Scan

Fig. 31

In VHS, we still convert the 4.43 MHz down to a lower frequency, namely 627 kHz, but the new colour method used in VHS format is a process of vector rotation. During recording, for head "A" (CHANNEL 1), the CHROMINANCE phase of horizontal line in the same phase.

For head "B" (CHANNEL 2) we DELAY the chrominance phase 90° per horizontal line (H).

VECTOR (PHASE) ROTATION:

CHANNEL 1 Same phase/H

CHANNEL 2 −90°/H

Fig. 32 shows what this looks like on tape.

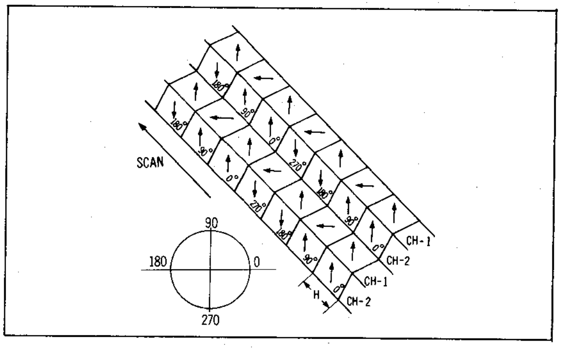

SCAN
90
180
0
270
CH-1
CH-2
CH-1
CH-2
H

Fig. 32

Now assume that head "A" or "B" plays back over track A1 or B1 it will produce a vector output as such:

Head "A" or "B" when tracking over A1 or B1 will have an output consisting of the main signal (large vectors) and some crosstalk components (small vectors).

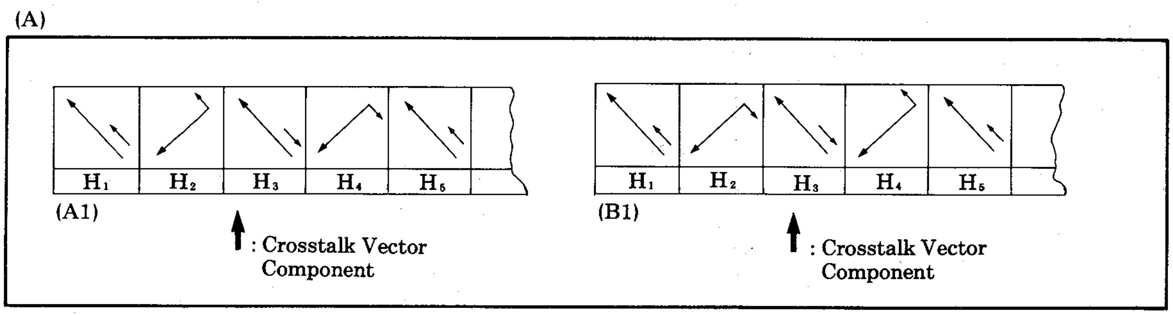

(A)
H_1 H_2 H_3 H_4 H_5
(A1)
↑ : Crosstalk Vector Component
H_1 H_2 H_3 H_4 H_5
(B1)
↑ : Crosstalk Vector Component

Fig. 33

Fig. 34, then is a vector representation of the playback chrominance signal from the head.

One of the most important things done in the playback process is the restoration of the vectors to their original phase. This is done by reversing the vector rotation process that was used in the recording.

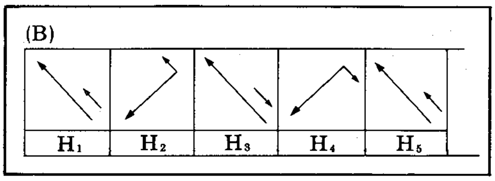

(B)
H_1 H_2 H_3 H_4 H_5

Fig. 34

This restored signal is then split 2 ways. One path goes to one input of an adder. The other path goes to a delay line which delays the signal by 2H. The output of the delay line goes to the other input of the adder. Fig. 35 explains.

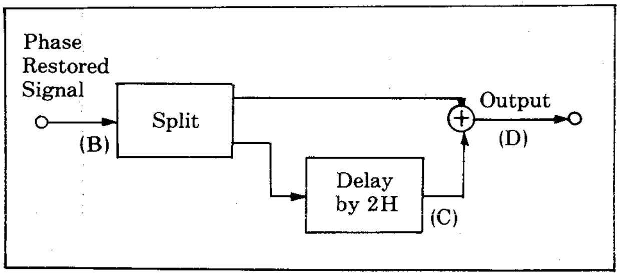

Phase Restored Signal
(B)
Split
Delay by 2H
(C)
Output
(D)

Fig. 35

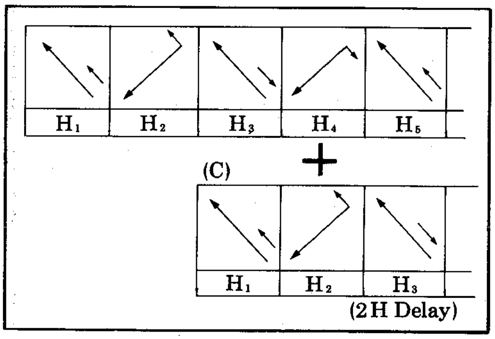

H_1 H_2 H_3 H_4 H_5
(C)
+
H_1 H_2 H_3
(2H Delay)

Fig. 36

As can be seen in Fig. 36, the crosstalk component has been eliminated after the first H line. We have now a chrominance signal free of adjacent channel crosstalk.

(D)

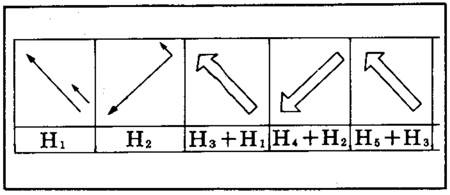


Fig. 37

The double output in Fig. 37 is not a problem because it can always be reduced. The process of adding a delayed line to an undelayed line is permissable because any 2 adjacent lines in a field contain nearly the same chrominance information.
So, if 2 adjacent lines are added, the net result will produce no distortion in the playback picture.
In conjunction with the crosstalk elimination is the re-conversion of the chrominance 627kHz to its original 4.43MHz. Now the color signal is totally restored.

7. THE RECORDED SIGNAL

Video signals, as stated before contain frequencies between DC and about 5MHz.
In converted subcarrier direct recording, the luminance and chrominance portions of the signal are separated.
This process of separation reduces somewhat the frequency range of the luminance and chrominance signals. Since the VHS colour system is a form of converted subcarrier direct recording, it too encounters this effect. The frequency ranges of the separated luminance and chrominance signals can be shown. See Fig. 38.

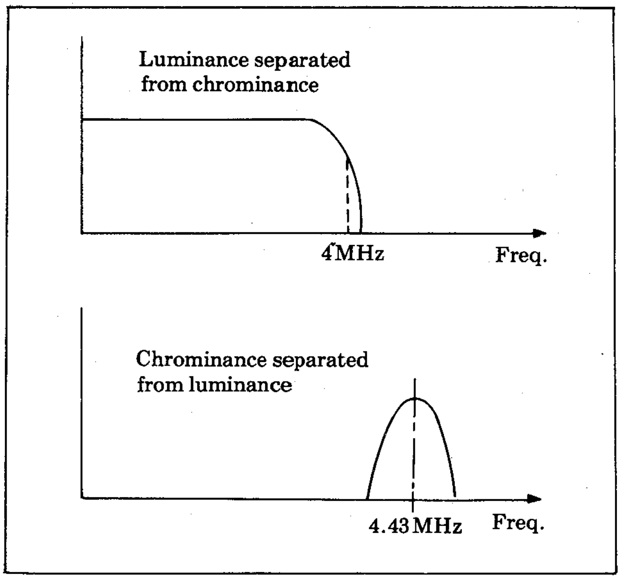


Fig. 38

When the luminance signal is FM modulated, it produces an FM signal which occupies a new area in the spectrum.
It was explained before that the instantaneous level of the video signal sets the instantaneous frequency of the FM carrier.
In VHS the lowest level of the video signal, sync tip, sets the FM carrier to 3.8MHz. Peak white portions of the video signal set the FM carrier to 4.8MHz. Carrier deviation is therefore from 3.8 to 4.8MHz. When generating an FM signal, sidebands are also produced. These sidebands lie above the 4.8MHz carrier swing and below the 3.8MHz carrier swing. See Fig. 39.
When the chrominance signal is converted down to 627kHz it will lie below the lower sidebands of the FM modulated luminance signal. Also see Fig. 39.

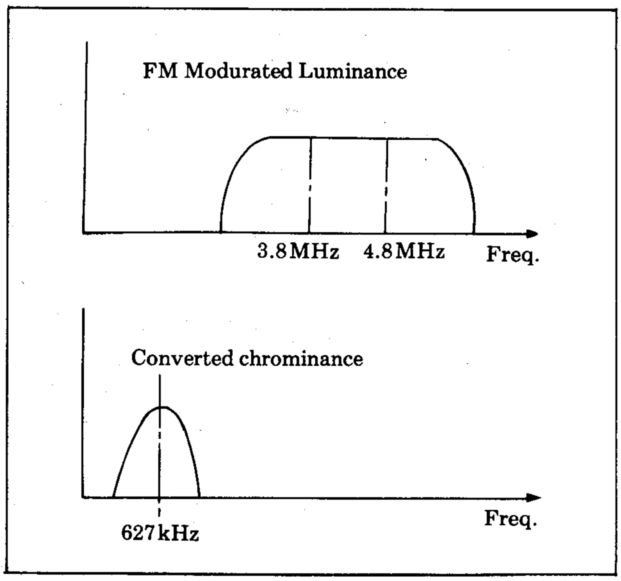


Fig. 39

The FM and converted chrominance signals are mixed before being recorded. The actual signal that is applied to the tape is shown in Fig. 40.

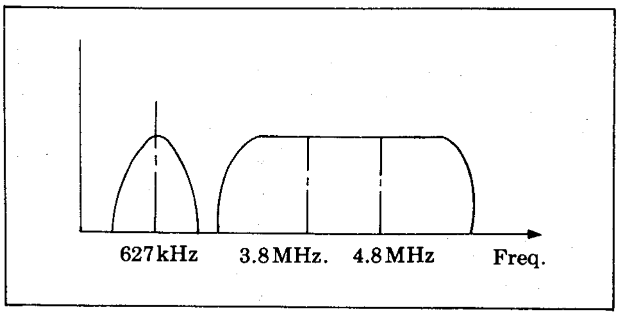
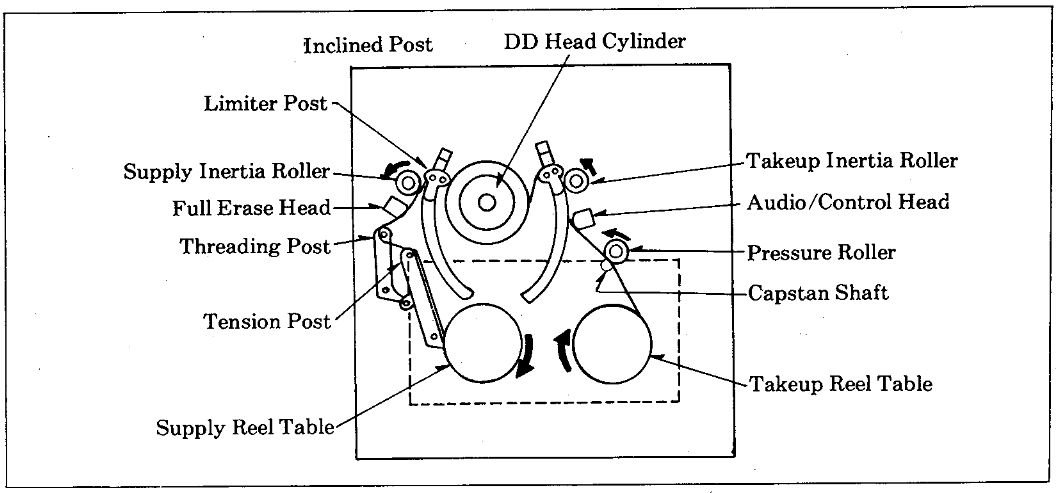


Fig. 40

8. TAPE LOADING



Inclined Post
DD Head Cylinder
Limiter Post
Supply Inertia Roller
Full Erase Head
Threading Post
Tension Post
Supply Reel Table
Takeup Inertia Roller
Audio/Control Head
Pressure Roller
Capstan Shaft
Takeup Reel Table

Fig. 41

In VHS, the tape path out of the cassette, across the stationary heads and around the video head cylinder forms a letter "M", thus the name "M" Loading. See Fig. 41.

The M loading has several advantages over previous, more complex loading formats.

1) Less tape is pulled out from the cassette. This reduces the chances of tape spillage and tangles.
2) Because the tape path in the M load pattern is short, loading time is only 3 seconds, including video muting.
3) FF and REW are performed INSIDE the cassette, further reducing the chances of tape damage.

9. SAFETY FEATURES

The M loading format incorporates many safety features to guard against accidental damage to the tape. If any of the mechanical failures listed below occurs, the recorder will go into the stop mode.

1) If loading takes longer than 5 sec.
2) If take up fails to start after 3 sec.
3) If take up fails during Record or Playback.
4) If the head cylinder fails to start.
5) If ANY belt breaks.
6) If the auto-stop lamp burns out.

The video tape in the cassette is worth protecting, so if any of these potentially dangerous failures occurs while the unit is recording or playing back, it will automatically stop.

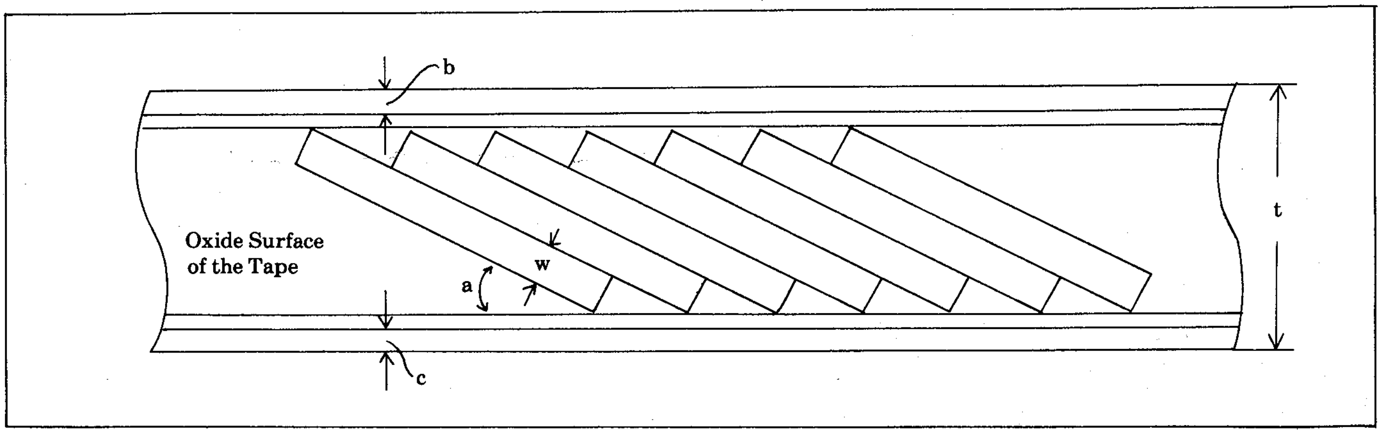
It cannot be operated again until the problem is solved.

10. THE TAPE AND TAPE FORMAT

The tape used in VHS is by itself a high quality product which assures good performance in a high density system.

The format of the tape for PAL VHS standard is shown, in Fig.. 42.

Tape Width (t):	1/2″
Tape Speed:	23.39 mm/sec
Head to Tape Speed:	4.85 m/sec
Video Track:	
Width (w);	49μ (0.049 mm)
Angle (a);	5°57′
Audio Track:	
Width (b);	1 mm
Control Track:	
Width (c);	0.75 mm



b
Oxide Surface
of the Tape
w
a
t
c

Fig. 42

CIRCUIT DESCRIPTION

Power Supply Circuit

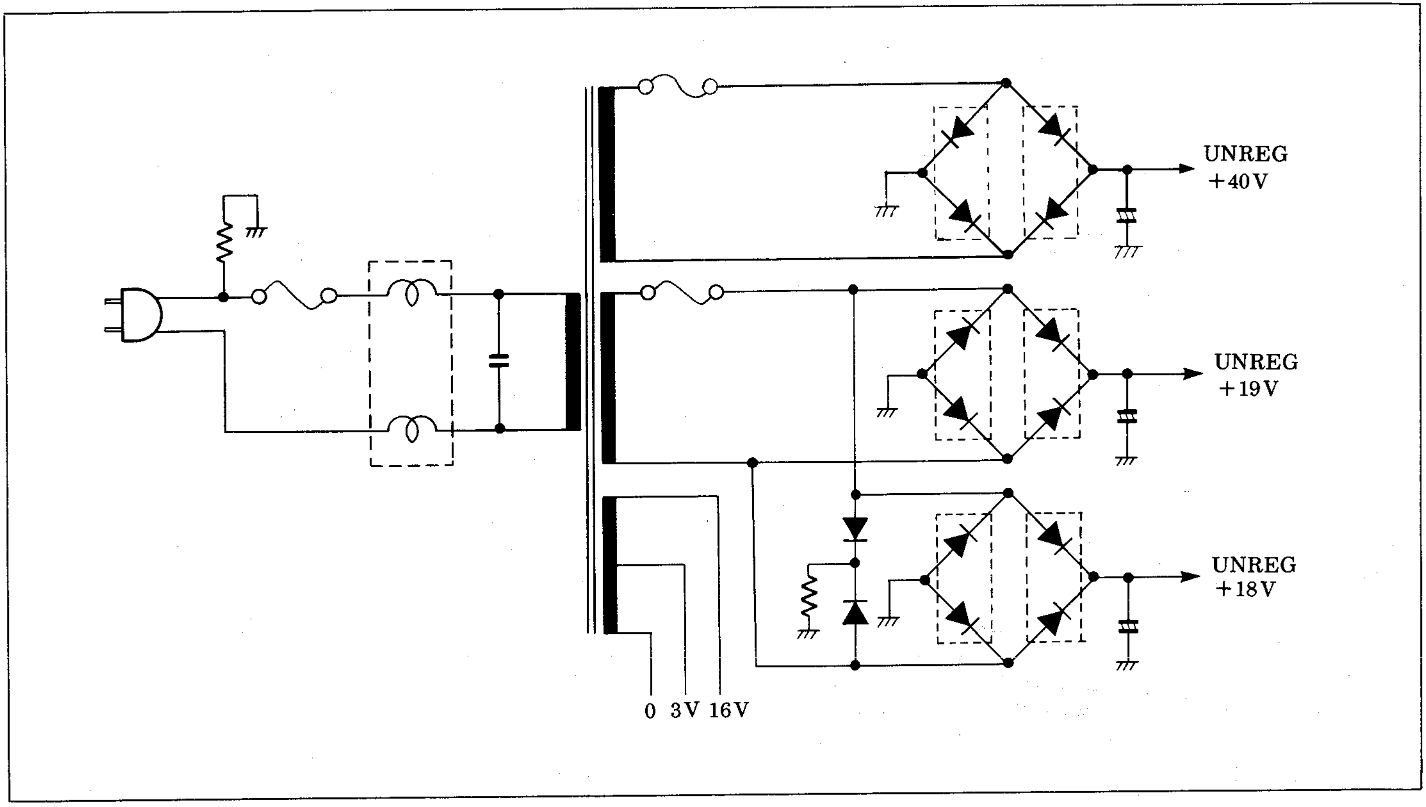


Fig. 43

The NV-8610 Video Cassette Recorder power supply uses a power transformer (T6301) and three bridge rectifier circuits to develop sources of unregulated +18 volts, unregulated +19 volts and unregulated + 40 volts DC. Using D110 and D111, produce the "power off detector" supply. This voltage is applied to the Transport and Control board logic system to sense a power failure and operate the stop solenoid and pressure roller solenoid so that the machine is not left in an operating mode in the event that AC power is lost.
The 16-volts AC and 3-volts AC are used to operate the digital timer.
AC power for the main power transformer is supplied from the AC line through a 1.0A (F101) protects unregulated +19 volts and unregulated +18 volts supply. And the fuse 250mA (F102) protects unregulated +40 volts supply.
The unregulated 19-volts supply is applied to the transport and Servo Board where upon it provides power to operate much of the logic circuitry contained on operate on this board as well as pressure solenoid. Also voltage is supplied to the D-D Motor where it provides input power to operate the three-phase inverter that ultimately drives the D-D cylinder motor.
The unregulated 18 volts supply is applied to Transport Board whereupon it is regulated to 12 volts DC which is operated by a servo regulator circuit that utilizes low-level driver circuit. The 12 volts source appears at the emitter of transistor Q6301 and is measurable at test point TP612.
The unregulated 40 volts supply is applied to the TV demodulator section.
The unregulated 3 volts and 16 volts are applied to Timer Circuit whereupon it provides power to operate much of the logic circuit on this board.

Regulator & Transport Circuits

GENERAL

The transport control board (VEP0669H1), contains all of the circuits used for stop solenoid activation, pressure roller solenoid activation, loading and unloading, head cylinder protection, some circuits for Servo Control and Audio Section.
The explanations will be given section by section, Fig. 44.
We can see the various functions it performs.

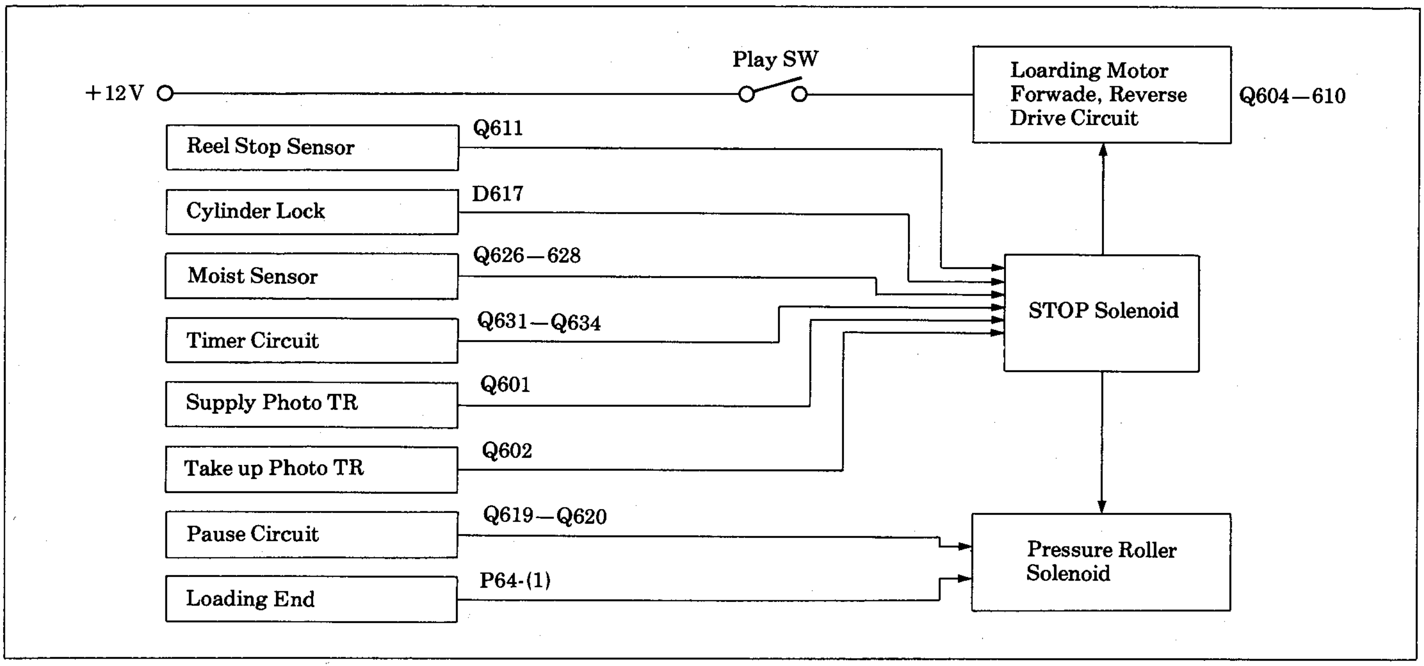

+12V
Play SW
Loarding Motor Forwade, Reverse Drive Circuit
Q604—610
Reel Stop Sensor
Q611
Cylinder Lock
D617
Moist Sensor
Q626—628
Timer Circuit
Q631—Q634
STOP Solenoid
Supply Photo TR
Q601
Take up Photo TR
Q602
Pause Circuit
Q619—Q620
Pressure Roller Solenoid
Loading End
P64-(1)

Fig. 44

I. Stop Solenoid

The stop solenoid, when activated, will mechanically place the operation buttons into the stop mode, just as if someone pressed the STOP button. The stop solenoid functions mainly as a safety device to stop the unit in the event that any of several potentially dangerous conditions occur.
These conditions are detected by:

1. **Take up Sensor**
   If the unit is rewinding, and the beginning of the tape is reached, it is desirable to have the unit stop before undue strain is placed on the tape. The very beginning of the tape is actually a translucent plastic leader. When the sensor lamp shines through this leader into the take-up photo transistor, the unit stops.
2. **Supply Sensor**
   If the unit is in record, playback or fast forward, it is again desirable to stop the unit before the actual end of the tape is reached. The end of the tape is again a translucent leader which when detected by the supply photo transistor will stop the unit.
3. **Sensor Lamp**
   This is the lamp that actually shines light through the translucent tape into either of the photo transistors. If this lamp burns out, the unit will stop so that tape damage cannot occur in the FF or REW modes. (Because in this case, the photo transistors will not operate.)
4. **Tape Protection**
   If the unit somehow fails to load after 5 seconds or if during record or playback, take-up fails for more than 3 seconds, the unit will stop—anticipating a problem.

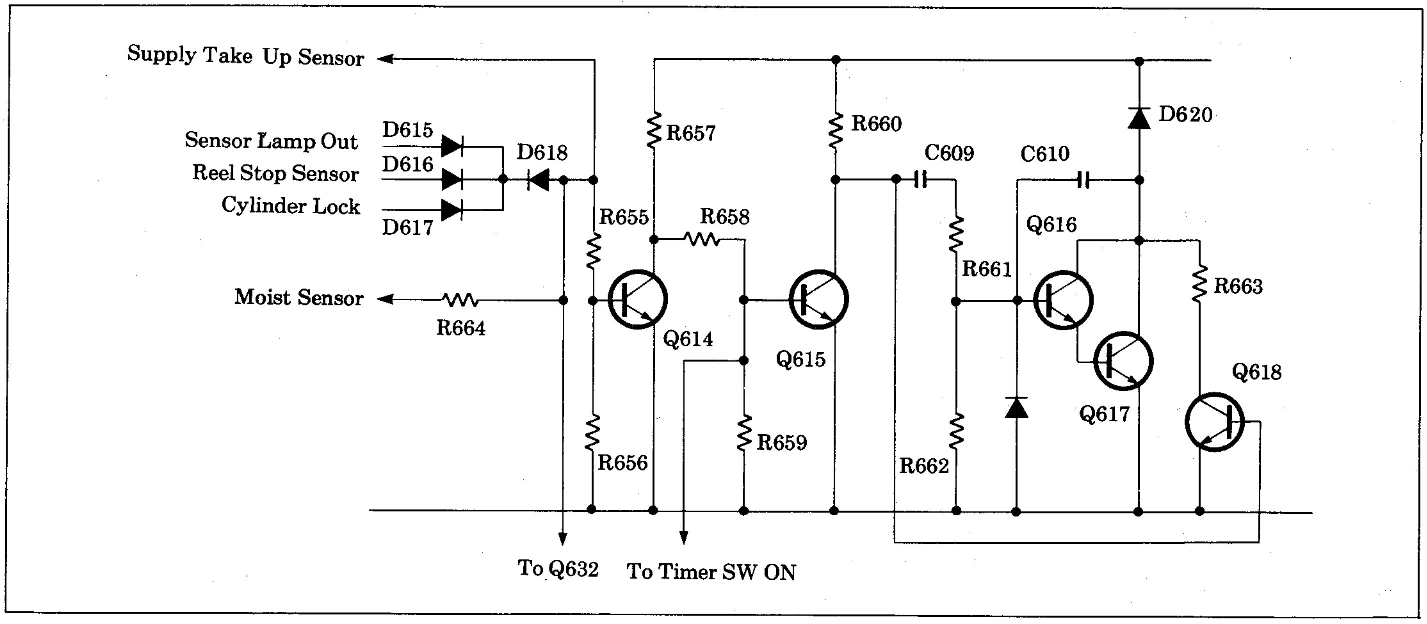

Supply Take Up Sensor
Sensor Lamp Out
Reel Stop Sensor
Cylinder Lock
D615
D616
D617
D618
Moist Sensor
R664
R655
R656
R657
R658
R659
Q614
Q615
R660
C609
C610
R661
R662
Q616
Q617
D620
R663
Q618
To Q632
To Timer SW ON

Fig. 45

5. **Moist Sensor**

   If moisture or condensation occurs inside the unit around the head cylinder, the unit will stop AND ALL FURTHER OPERATIONS WILL BE PROHIBITED unit the situation has cleared (moisture has evaporated).

6. **Timer Circuit**

   If the unit is set for unattended recording, and the timer switch is set ON, the unit will shut down and the stop solenoid will activate to return all of the operation buttons to their OFF positions.

7. **Power Interrupt**

   When the unit is turned off, the stop solenoid momentarily activates to return all of the operation buttons to thier OFF positions.

8. **Memory Rewind**

   The rewind action will stop if 000 is reached on the counter.

Transistor Q618 is the transistor which conducts the holding current for the stop solenoid. Transistors Q615 and Q617 are monentarily turned on when the stop solenoid activated to ensure the engagement of the solenoid plunger. See Fig. 45 for the stop solenoid diagram.

2. Pressure Roller Solenoid

The purpose of the pressure roller solenoid circuit is to engage the pressure roller by passing current through the solenoid. The pressure roller assures smooth tape travel when it engages against the capstan shaft.
The circuit must also disengage the pressure roller for the stop and pause mode. Basically, all the circuit has to do is to turn the pressure roller solenoid ON and OFF.

3. Loading and Unloading

The loading/unloading circuit controls the loading motor in the loading and unloading modes. It is also involved in controlling the capstan speed during the loading or unloading modes.

4. Capstan Motor Speed Control

The capstan motor drives the capstan as well as the tape reels. The exact speed of the motor is controlled by the control circuit board. However, it is the transport board that puts the capstan motor at approximately the correct speed.
For instance, during recording or playback, the transport board puts the capstan motor at a certain speed which is about correct to drive the capstan and tape reels. The exact speed of the capstan is controlled by the servo board.
But during rewind and fast forward, the exact speed of the capstan does not matter. (Rewind and fast forward are performed inside the cassette, not by the capstan and pressure roller.) Also, it is desirable to have the reels move faster to perform a true rewind and fast forward action. It is the purpose of the transport board to increase the capstan motor speed for rewind and fast forward.
Also, during unloading the tape is would back into the supply reel. The supply reel is driven by the capstan motor, as an extra measure to protect the tape. The capstan motor speed is reduced during the unloading process to that the tape can be gently wound, with less torque, back on to the supply reel. The only exception to this would be in the case of moisture. If moisture or condensation formed on the tape or video head cylinder, the chances are good that the tape will stick to the cylinder or on any metal surface. So, if moisture is detected, the unit will unload the tape with increased torque to be sure that it does not stick into any surface.

Luminance Process Section

MAIN FEATURES

1. Introduction of New IC's

ITEM	PART NO.	FUNCTION	FUNCTION DETAILED
A	AN6300	Video Recording	AGC, CLAMP, WHITE/DARK CLIPPERS, FM MOD, B/W-colour SW
B	AN6320	Head Amp	HEAD AMP, HEAD SW
C	AN6331	Video Playback	LIMITER, FM DEMOD, DROPOUT COMPENSATOR, NOISE CANCELLER, E-E/V-V SW
D	SN96670N	Limiter	LIMITER

2. Keyed AGC

AGC response is greatly improved by the introduction of Keyed AGC method.

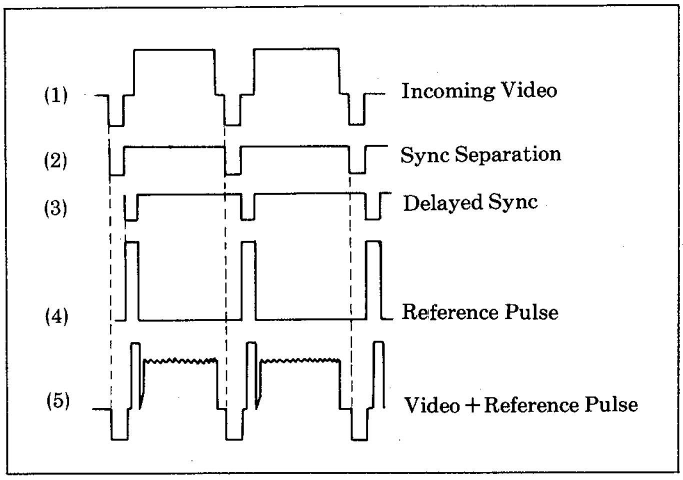

(1)
Incoming Video
(2)
Sync Separation
(3)
Delayed Sync
(4)
Reference Pulse
(5)
Video + Reference Pulse

Fig. 46

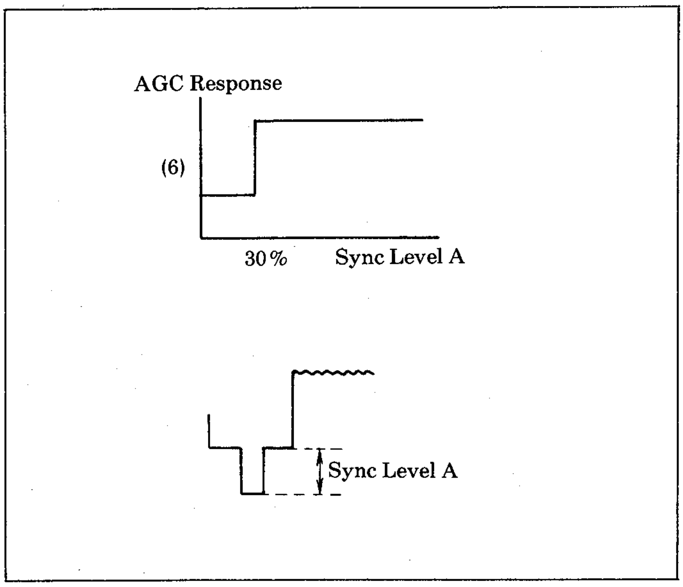

AGC Response
(6)
30%
Sync Level A
Sync Level A

Fig. 47

3. Transient Response Improvement for D.O.C. Pulse

(Improvement for Drop Out Compensator)

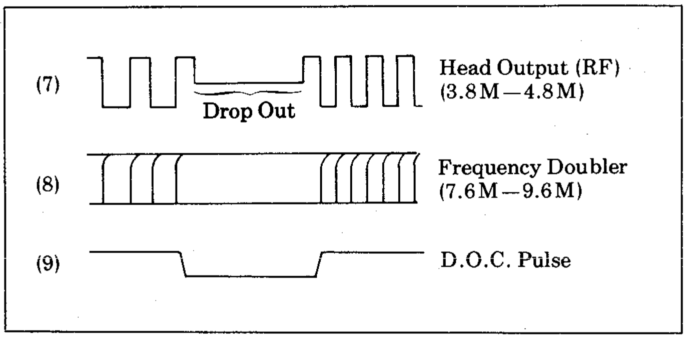

(7)
Drop Out
Head Output (RF)
(3.8M—4.8M)
(8)
Frequency Doubler
(7.6M—9.6M)
(9)
D.O.C. Pulse

Fig. 48

- * Since the head output frequencies are doubled, the transient response of D.O.C. pulse can be improved.
- * In addition to above improvement, the Drop Out detection sensitivity can be improved by adjusting the control R3137 (RF LEVEL ADJ).
  Because, by adjusting the control, the input level for D.O.C. is always same regardless of video head output level, resulting in higher sensitivity for D.O.C.

4. Overall Transient Response Improvement

By compensating the head amp group delay by FL303 and L323, 325, C389, 390, 391, better transient response can be obtained, resulting in less preshoot or noisy vertical line on a TV monitor.

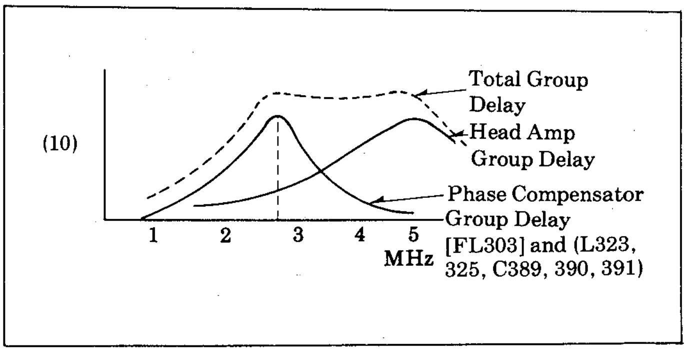


Fig. 49

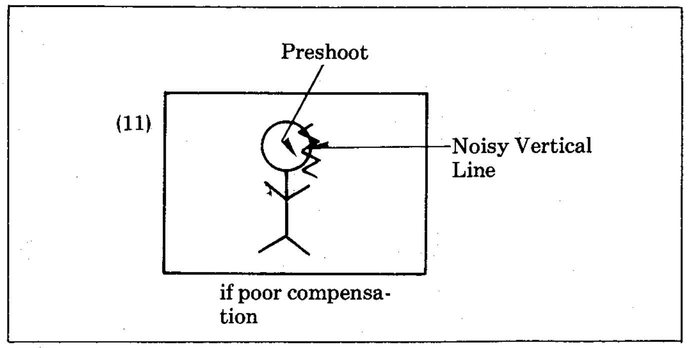

Preshoot
(11)
Noisy Vertical Line
if poor compensation

Fig. 50

GENERAL EXPLANATION

Refer to the attached Charts 1 and 2.

RECORDING PROCESS

- **Connector P21 (1)**

  The incoming video appears at TP301 (1Vp-p).
- **FL301 (5MHz LPF)**

  Thanks to this L.P.F., Only video (without high frequency noise components and sound carrier (5MHz).
- **AGC (Keyed AGC)**

  By using the keyed AGC method, steady video level can be obtained, even through the incoming video level is not exact 1Vp-p.
- **FL302 (3.0MHz LPF)**

  Incoming Video (A) Colour 4.43MHz Sub Carrier is eliminated by this filter.

  (B) B/W The AGC output goes to the amplifier (IC301 (19)).

  Above (A) and (B) switching is performed inside the IC301.
- **Non-linear Emphasis (between TP303 & TP304)**

  As you well know, the higher pre-emphasis response should be changed according to the input video level.

  (The lower the input level, the steeper the response should be.)
- **Dark/White Clipper**

  Dark Clip 150%

  White Clip......160%

  Since the video signal includes excessive overshoot and undershoot because of preemphasis action at the former stage, they should be clipped to prevent the overmodulation at the next stage (FM modulator).
- **FM Modulator**

  Video 0—5MHz—FM: Sync Tip 3.8MHz

  Peak White 4.8MHz

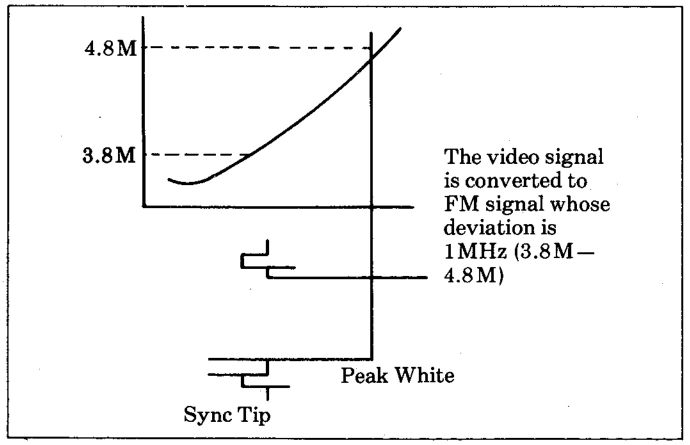


Fig. 51

- **B/W-Colour Switching (Q307, Q308)**

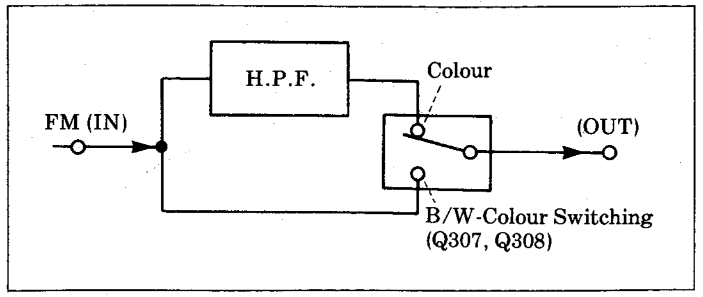

H.P.F.
Colour
FM (IN)
(OUT)
B/W-Colour Switching (Q307, Q308)

Fig. 52

The H.P.F. consists of L304, C329, C330, R342 and L305.

- Frequency Response of H.P.F.

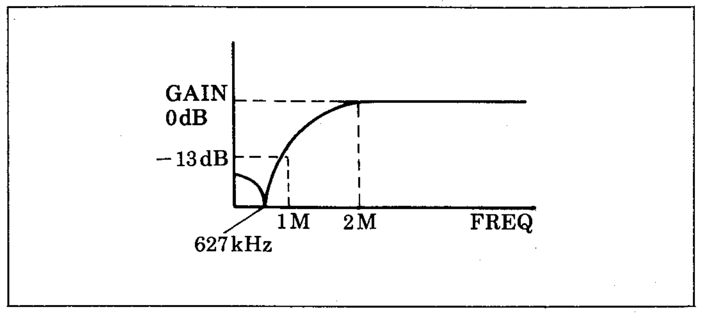


Fig. 53

- **Y-C Mixing (Q501 (B))**

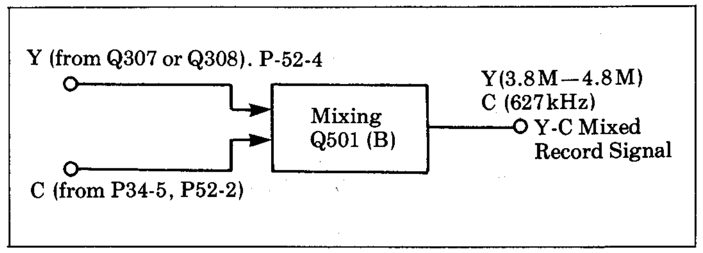

Y (from Q307 or Q308). P-52-4
Mixing Q501 (B)
Y(3.8M—4.8M)
C (627kHz)
Y-C Mixed Record Signal
C (from P34-5, P52-2)

Fig. 54

- **Record Amp (Q501, Q502, Q503, Q504)**

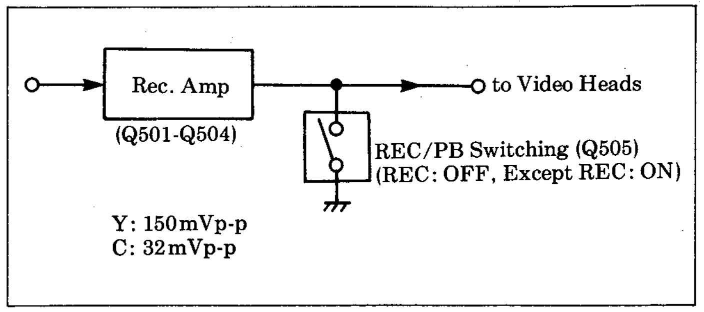

Rec. Amp
(Q501-Q504)
to Video Heads
REC/PB Switching (Q505)
(REC: OFF, Except REC: ON)
Y: 150mVp-p
C: 32mVp-p

Fig. 55

Chart 1 The Keypoint of Luminance Circuit Section

1. PAL Colour Video Signal, Recording Process

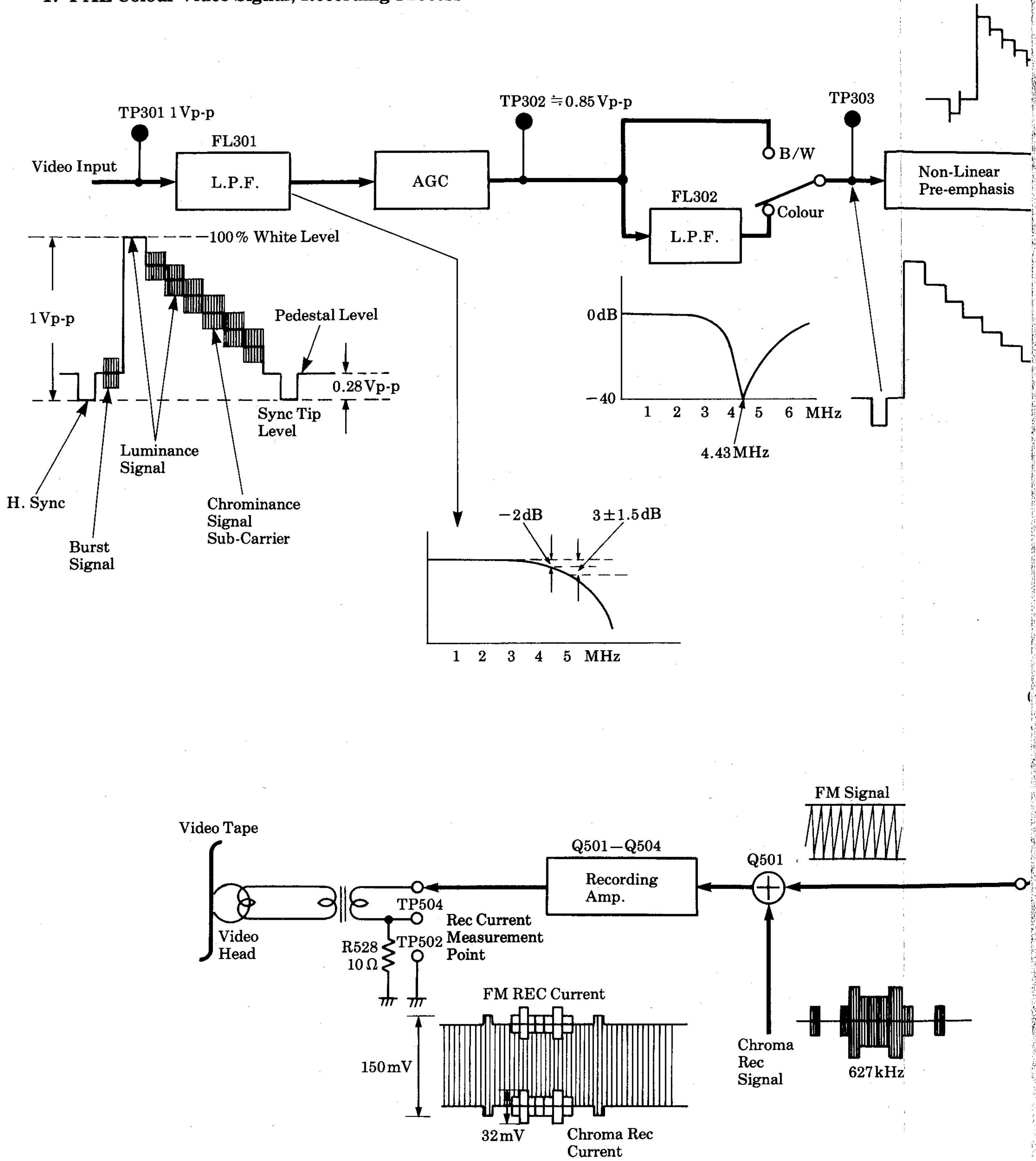
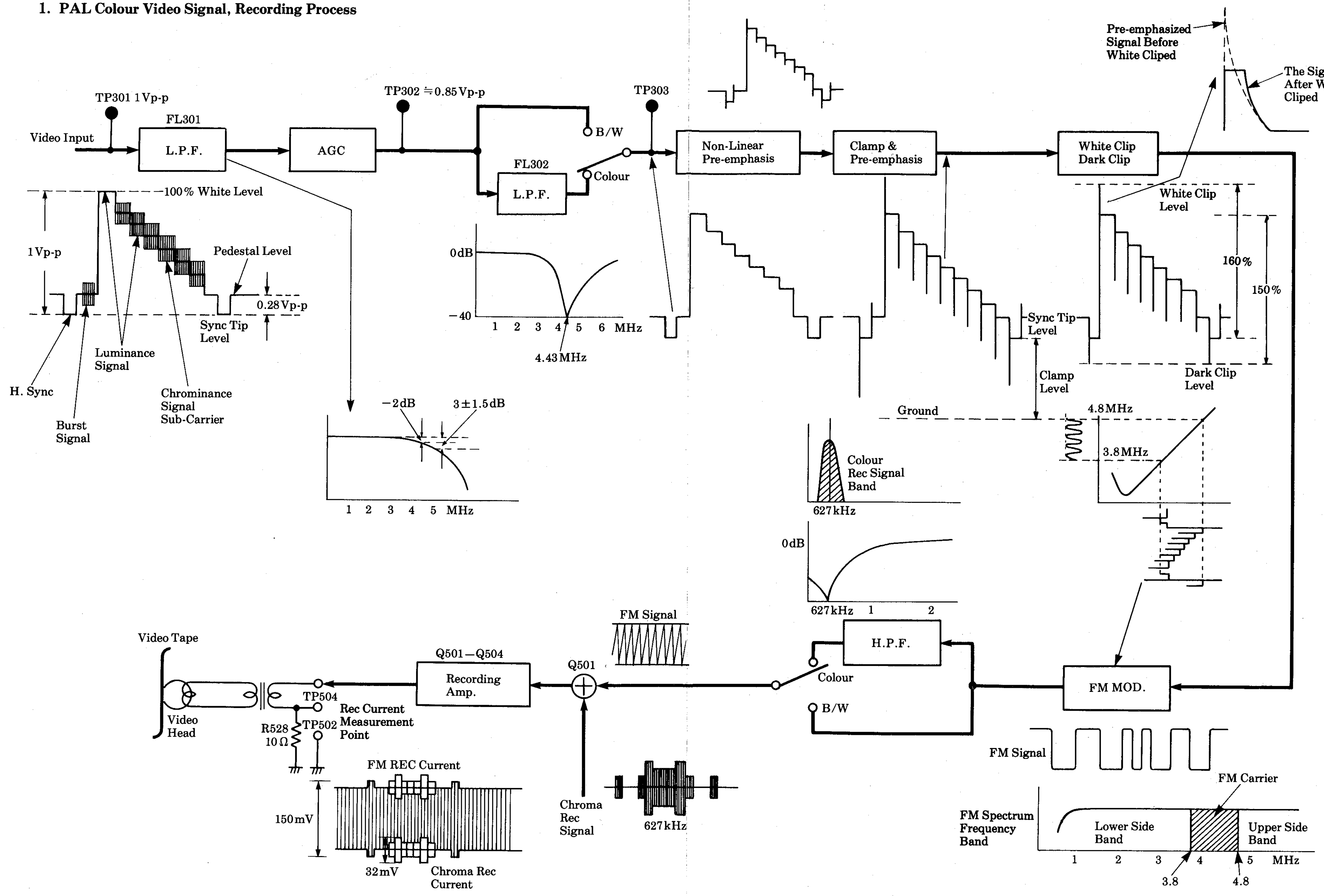

TP301 1Vp-p
FL301
Video Input
L.P.F.
AGC
TP302 ≒0.85Vp-p
B/W
FL302
L.P.F.
Colour
TP303
Non-Linear Pre-emphasis
100% White Level
1Vp-p
Pedestal Level
0.28Vp-p
Sync Tip Level
Luminance Signal
H. Sync
Burst Signal
Chrominance Signal Sub-Carrier
0dB
−40
1 2 3 4 5 6 MHz
4.43MHz
−2dB
3±1.5dB
1 2 3 4 5 MHz
FM Signal
Video Tape
Q501—Q504
Recording Amp.
Q501
TP504
Rec Current Measurement Point
Video Head
R528 10Ω
TP502
FM REC Current
150mV
32mV
Chroma Rec Current
Chroma Rec Signal
627kHz

Chart 1 The Keypoint of Luminance Circuit Section

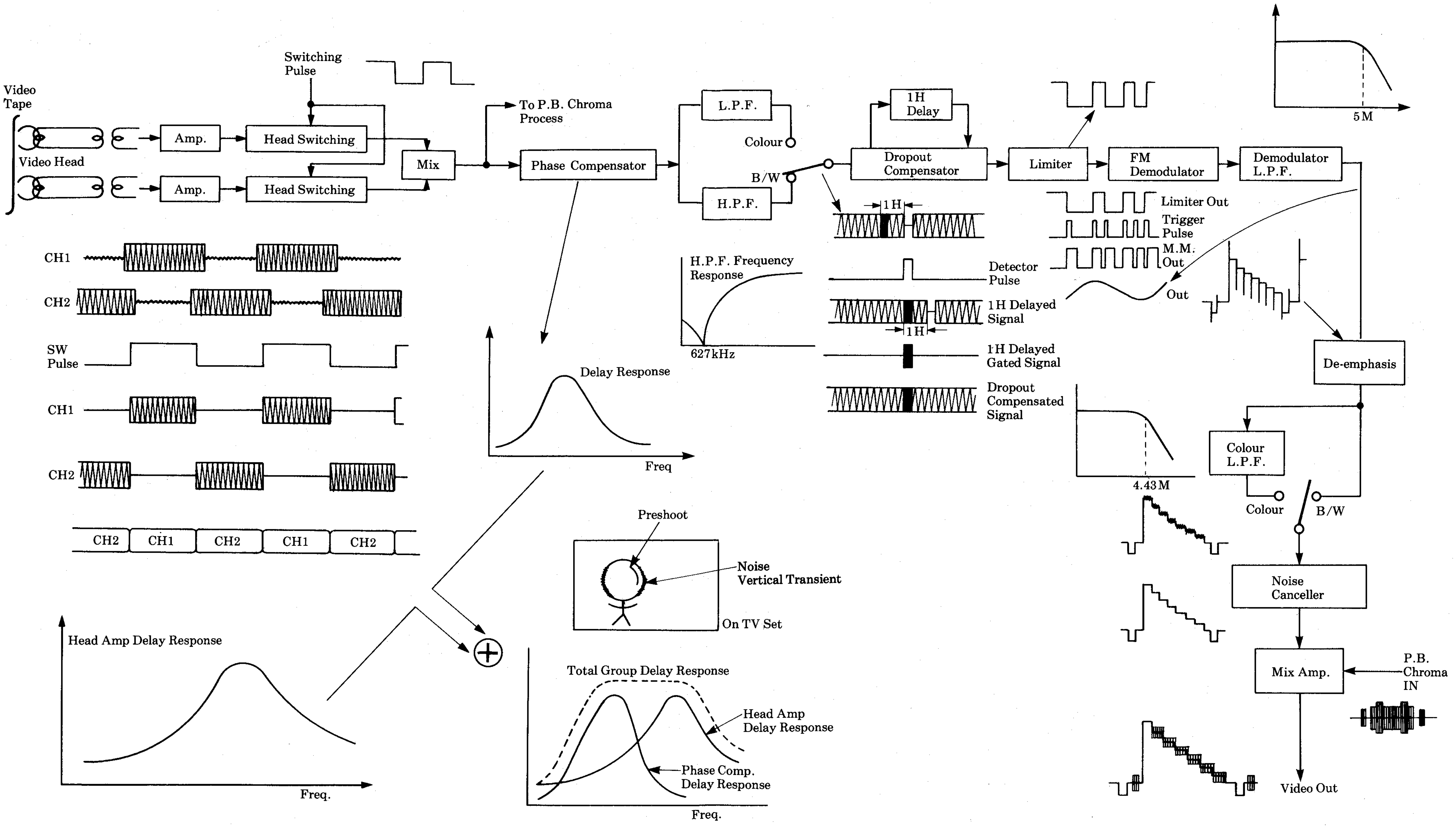
1. PAL Colour Video Signal, Recording Process



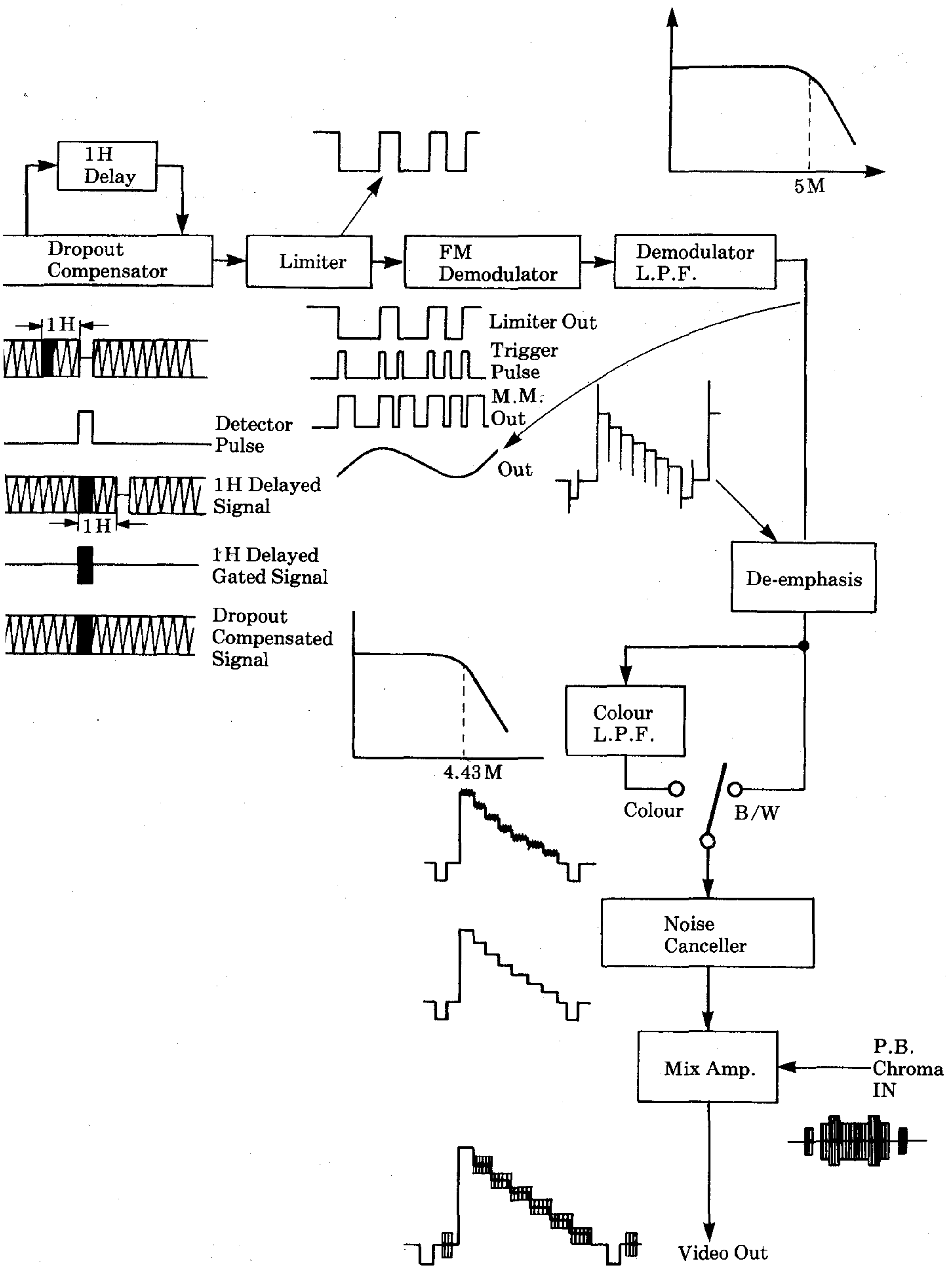
TP301 1Vp-p
FL301
Video Input
L.P.F.
AGC
TP302 ≒0.85Vp-p
B/W
FL302
L.P.F.
Colour
TP303
Non-Linear Pre-emphasis
Clamp & Pre-emphasis
White Clip Dark Clip
Pre-emphasized Signal Before White Cliped
The Signal After With Cliped
100% White Level
1Vp-p
Pedestal Level
0.28Vp-p
Sync Tip Level
Luminance Signal
H. Sync
Burst Signal
Chrominance Signal Sub-Carrier
0dB
−40
1 2 3 4 5 6 MHz
4.43MHz
−2dB
3±1.5dB
1 2 3 4 5 MHz
Sync Tip Level
Clamp Level
Ground
White Clip Level
160%
150%
Dark Clip Level
4.8MHz
3.8MHz
Colour Rec Signal Band
627kHz
0dB
627kHz 1 2
H.P.F.
Colour
B/W
FM MOD.
FM Signal
FM Signal
Q501
Q501−Q504
Recording Amp.
Video Tape
Video Head
TP504
Rec Current Measurement Point
R528 10Ω
TP502
FM REC Current
150mV
32mV
Chroma Rec Current
Chroma Rec Signal
627kHz
FM Carrier
FM Spectrum Frequency Band
Lower Side Band
Upper Side Band
1 2 3 4 5 MHz
3.8
4.8

Chart 2 The Keypoint of Luminance Circuit Section

2. PAL Colour Video Signal, Playback Process


Video Tape
Video Head
Amp.
Amp.
Switching Pulse
Head Switching
Head Switching
Mix
To P.B. Chroma Process
Phase Compensator
L.P.F.
H.P.F.
Colour
B/W
1H Delay
Dropout Compensator
Limiter
FM Demodulator
Demodulator L.P.F.
5M
CH1
CH2
SW Pulse
CH1
CH2
CH2
CH1
CH2
CH1
CH2
Delay Response
Freq
H.P.F. Frequency Response
627kHz
1H
Detector Pulse
1H Delayed Signal
1H
1H Delayed Gated Signal
Dropout Compensated Signal
Limiter Out
Trigger Pulse
M.M. Out
Out
De-emphasis
4.43M
Colour L.P.F.
Colour
B/W
Noise Canceller
Mix Amp.
P.B. Chroma IN
Video Out
Preshoot
Noise Vertical Transient
On TV Set
Head Amp Delay Response
Freq.
Total Group Delay Response
Head Amp Delay Response
Phase Comp. Delay Response
Freq.

If we haven't this phase compensator,
we have stronger preshoot and neisy
vertical line at picture's **transient** position.


1H Delay
Dropout Compensator
Limiter
FM Demodulator
Demodulator L.P.F.
5M
1H
Limiter Out
Trigger Pulse
M.M. Out
Detector Pulse
Out
1H Delayed Signal
1H
1H Delayed Gated Signal
Dropout Compensated Signal
De-emphasis
Colour L.P.F.
4.43M
Colour
B/W
Noise Canceller
Mix Amp.
P.B. Chroma IN
Video Out

PLAYBACK PROCESS

*** Head Amp & Head Switching (IC501)**

In the recording process, a video signal (Y: 3.8M—4.8M FM, C: 627kHz) was recorded by two video heads which are located on the upper cylinder exactly 180° apart from each other.
To prevent the noise from appearing at the switching portions, a video tape is touching on the cylinder more than 180° as shown below.

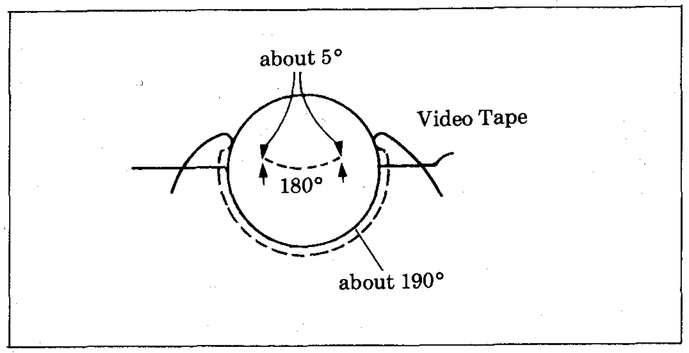

about 5°
Video Tape
180°
about 190°

Fig. 56

When the above signal is reproduced, the head switching circuit will be required.

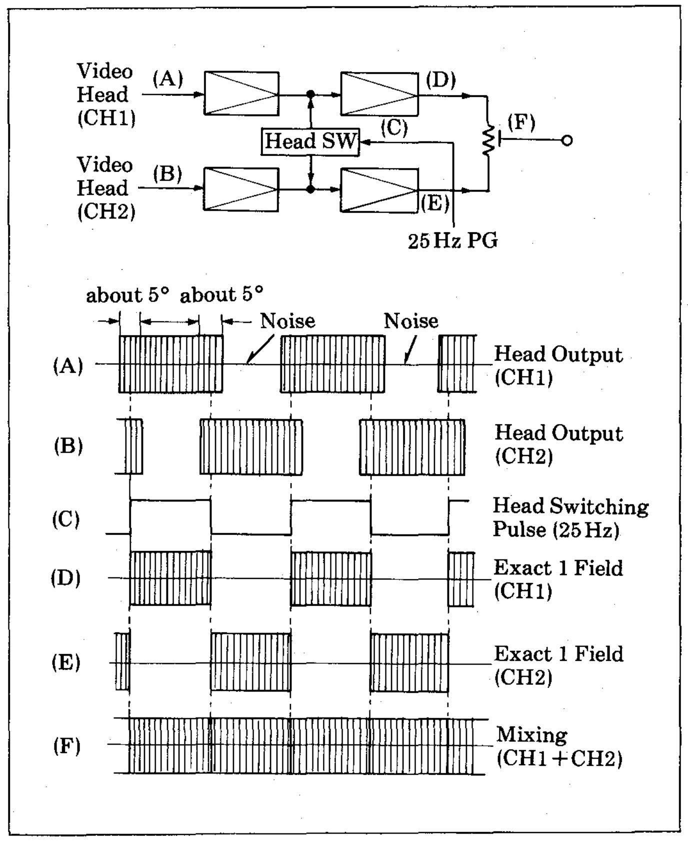

Video Head (CH1)
(A)
(D)
Head SW
(C)
(F)
Video Head (CH2)
(B)
(E)
25 Hz PG
about 5°
about 5°
Noise
Noise
(A)
Head Output (CH1)
(B)
Head Output (CH2)
(C)
Head Switching Pulse (25 Hz)
(D)
Exact 1 Field (CH1)
(E)
Exact 1 Field (CH2)
(F)
Mixing (CH1+CH2)

Fig. 57

*** FM Out From Head Amp**

The RF Output is sent to Phase Compensator (FL303) and (L323, 325, C389—390) for compensation of Head Amp Delay (Refer to Item 5 of Main Features), L.P.F. of 627kHz Chroma separation.

*** Drop Out Compensator**

If drop out occurs, thanks to the drop out compensator, the portion will be compensated by the 1H delayed signal.
(Refer to Item 4 of Main Features).

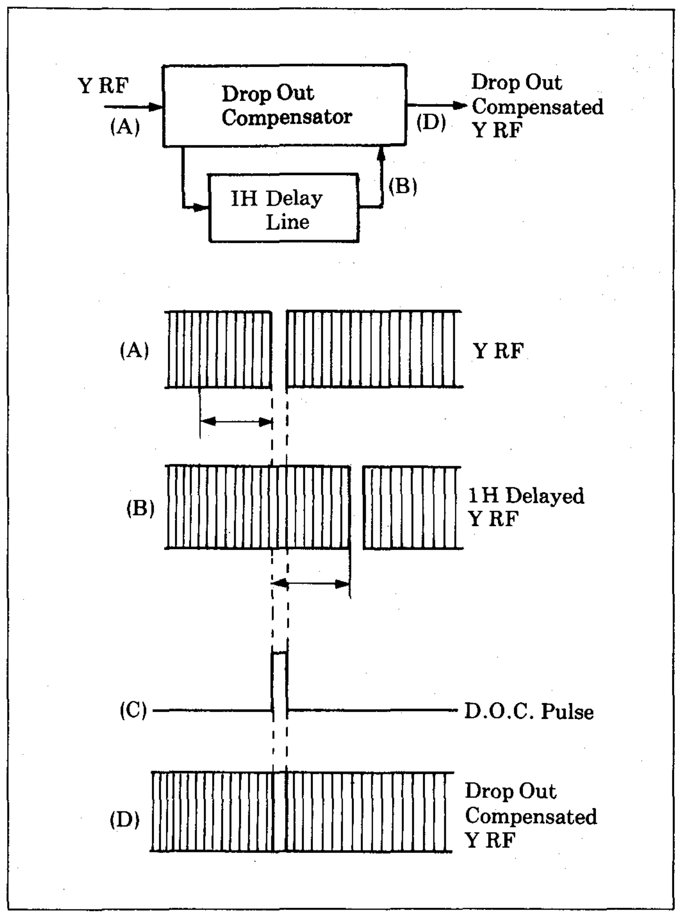
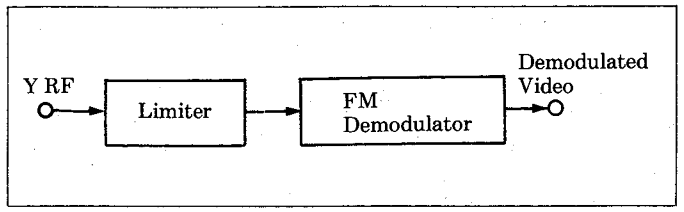

Y RF
(A)
Drop Out Compensator
(D)
Drop Out Compensated Y RF
IH Delay Line
(B)
(A)
Y RF
(B)
1H Delayed Y RF
(C)
D.O.C. Pulse
(D)
Drop Out Compensated Y RF

Fig. 58

*** FM Demodulator**

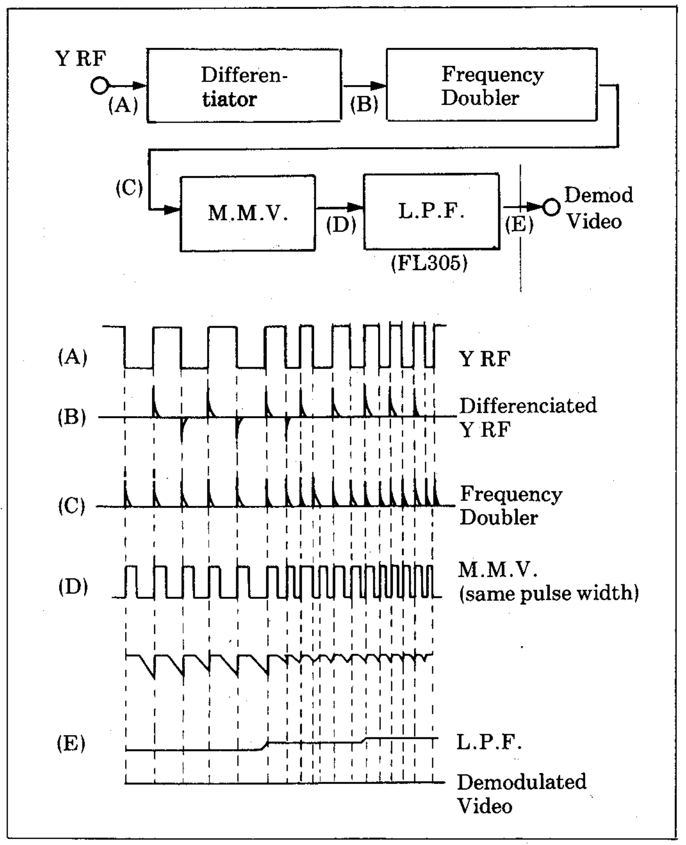
The RF signal in which drop out was contained was compensated by the Drop Out Compensator. The signal is then sent to the FM Demodulator after passing through limiter circuit.



Y RF
Limiter
FM Demodulator
Demodulated Video

Fig. 59

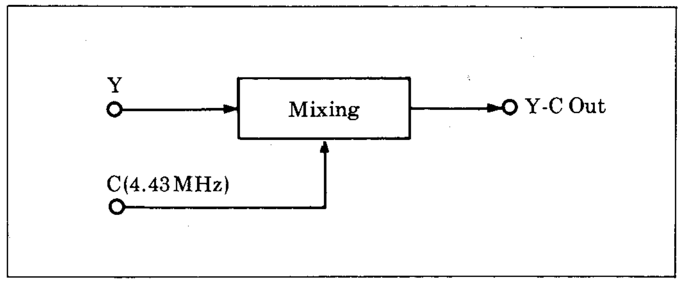
How to demodulate the RF signal to video is described below.



Y RF
(A)
Differen-tiator
(B)
Frequency Doubler
(C)
M.M.V.
(D)
L.P.F.
(FL305)
(E)
Demod Video
(A)
Y RF
(B)
Differenciated Y RF
(C)
Frequency Doubler
(D)
M.M.V. (same pulse width)
(E)
L.P.F.
Demodulated Video

Fig. 60

*** Y-C Mixing**



Y
Mixing
Y-C Out
C(4.43 MHz)

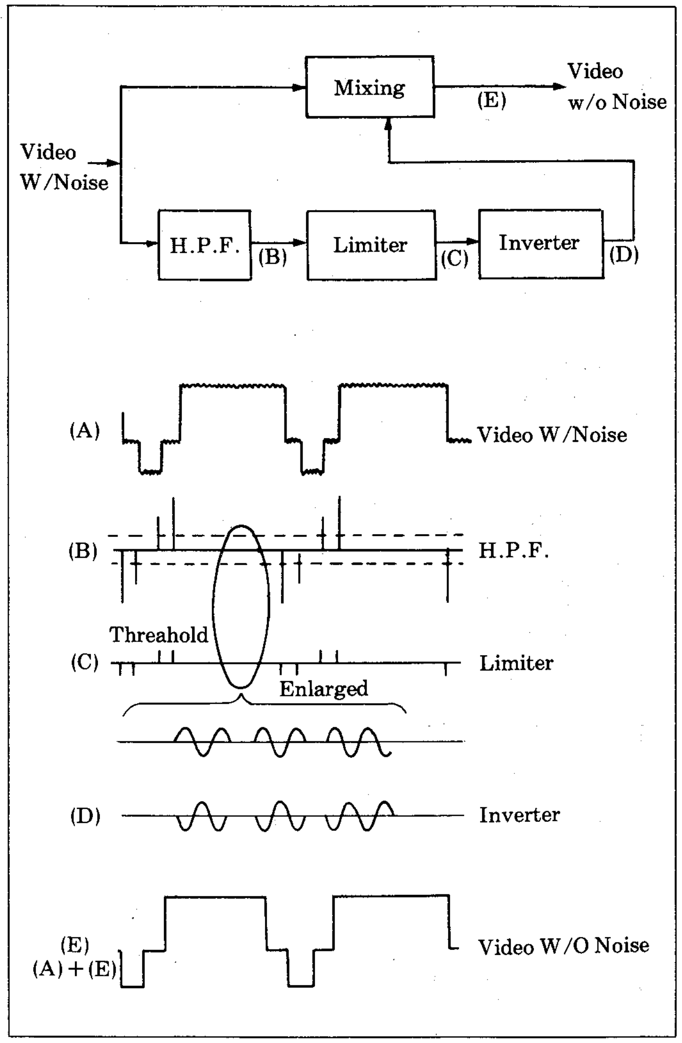
Fig. 61

*** Deemphasis**

In the Record process, the video signal was pre-emphasized. Therefore, in the Playback process, it should be de-emphasized. PLAYBACK (De-emphasis) is formed from Q317, C360, C361, R385.

*** Noise Canceller**

The purpose of the noise canceller is to improve overall signal to noise ratio and works in the following way. Generally speaking, noise lies in the high frequency region, and its amplitude is fairly low.

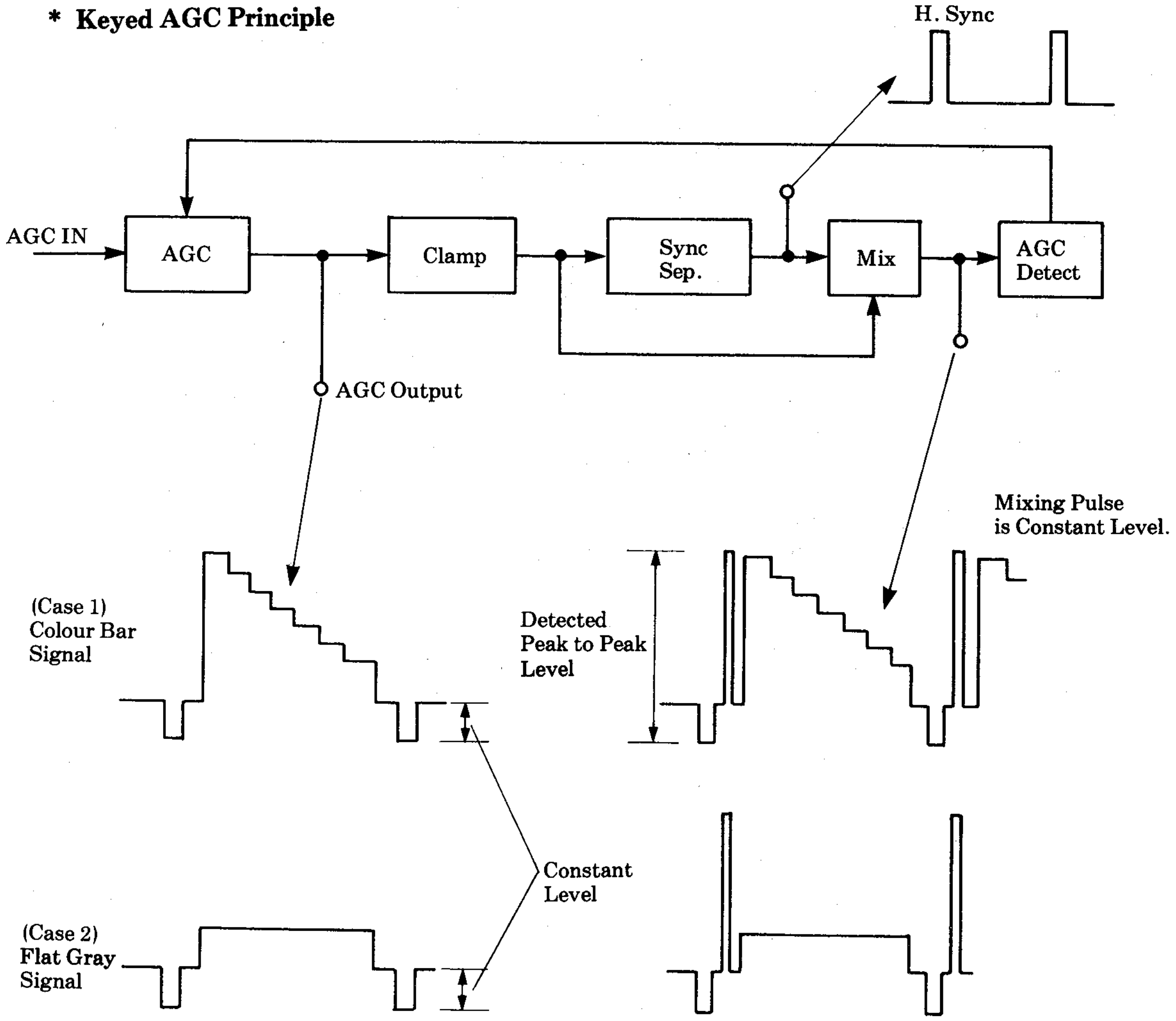


Video W/Noise
Mixing
(E)
Video w/o Noise
H.P.F.
(B)
Limiter
(C)
Inverter
(D)
(A)
Video W/Noise
(B)
H.P.F.
Threahold
(C)
Limiter
Enlarged
(D)
Inverter
(E)
(A)+(E)
Video W/O Noise

Fig. 62

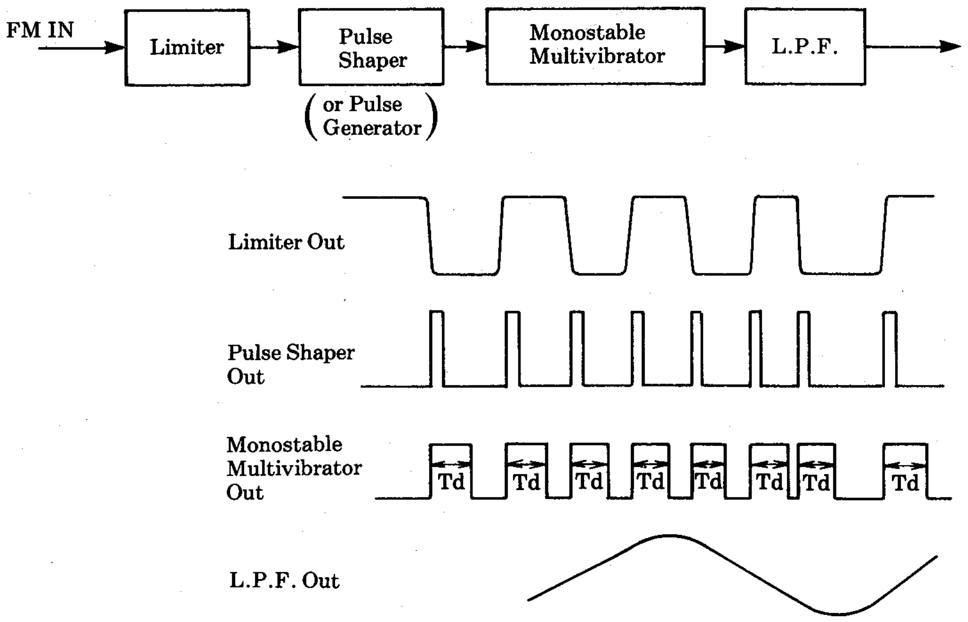
Chart 3

* Keyed AGC Principle



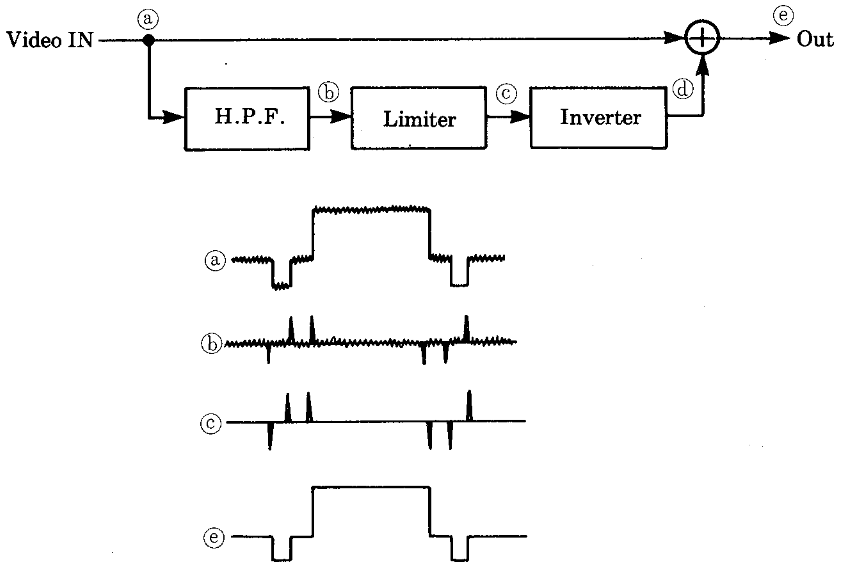
H. Sync
AGC IN
AGC
Clamp
Sync Sep.
Mix
AGC Detect
AGC Output
Mixing Pulse is Constant Level.
(Case 1) Colour Bar Signal
Detected Peak to Peak Level
Constant Level
(Case 2) Flat Gray Signal

* FM Demodulator Principle



FM IN
Limiter
Pulse Shaper
(or Pulse Generator)
Monostable Multivibrator
L.P.F.
Video Out
Limiter Out
Pulse Shaper Out
Monostable Multivibrator Out
Td
L.P.F. Out

* Noise Canceller Principle



Video IN
ⓐ
H.P.F.
ⓑ
Limiter
ⓒ
Inverter
ⓓ
ⓔ
Out
ⓐ
ⓑ
ⓒ
ⓔ

Chrominance Process Section

MAIN FEATURES

1. Introduction of IC

Item	Part No.	Function	Function Detailed
A	AN236	Colour Rec/P.B.	APC Phase Compensator, Killer Phase Compensator, 4.43 MHz V.X.O.
B	AN305	Colour Rec/P.B.	ACC, Killer Amp. Balance Modulator
C	AN337	Colour Rec/P.B.	Sync Sep., AFC Phase Compensator, 2.500 MHz VCO, Balance Modulator
D	AN6342	Colour Rec/P.B.	1/88,672 Frequency Divider
E	AN6061A	Colour Rec/P.B.	H. Sync Sep., 1/4 Divider, 1/40 Divider, 90° Shifted Signal SW, Inverter

1. Playback Band Pass Filter (4.43 MHz)...Block Filter.
2. Field Start Burst Inhibit Circuit is simplified.
3. 4.43 MHz CW for APC REC/PB Switching Circuit is simplified.
4. 50 Hz/4.43 MHz = 1/88,672 Frequency Divider IC805 (AN6342).

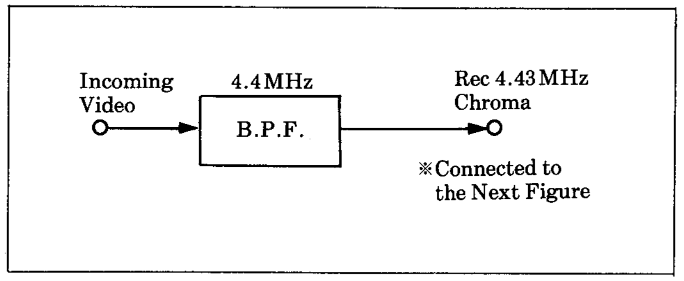
GENERAL EXPLANATION

Refer to the Attached Charts 4 and 5.

RECORDING PROCESS

*** BPF (on Luminance Board) (L319, 320, C398)**

An incoming video signal is directly sent to the Band Pass Filter (L319, 320, C398) on the Luminance Process Board.



Incoming Video
4.4 MHz
B.P.F.
Rec 4.43 MHz Chroma
※Connected to the Next Figure

Fig. 63

The chrominance signal which was separated by the band pass filter (L319, 320, C398) is sent to the ACC circuit, where the chrominance signal level (Burst Level) is automatically controlled.

*** Balanced Modulator (IC801)**

The record 4.43 MHz Chroma is hetrodyned against a 5.060 MHz CW which is applied from FL803. Two kinds of signals—summed Component (9.49 MHz) and balanced component (627 kHz)—are produced in the Balanced Modulator.

By passing through the Low pass filter (FL801), only 627 kHz (Converted chroma) will be selected. This chroma is mixed with the luminance signal (RF: 3.8M—4.8M) at the base of Q501 on the Luminance Process board.

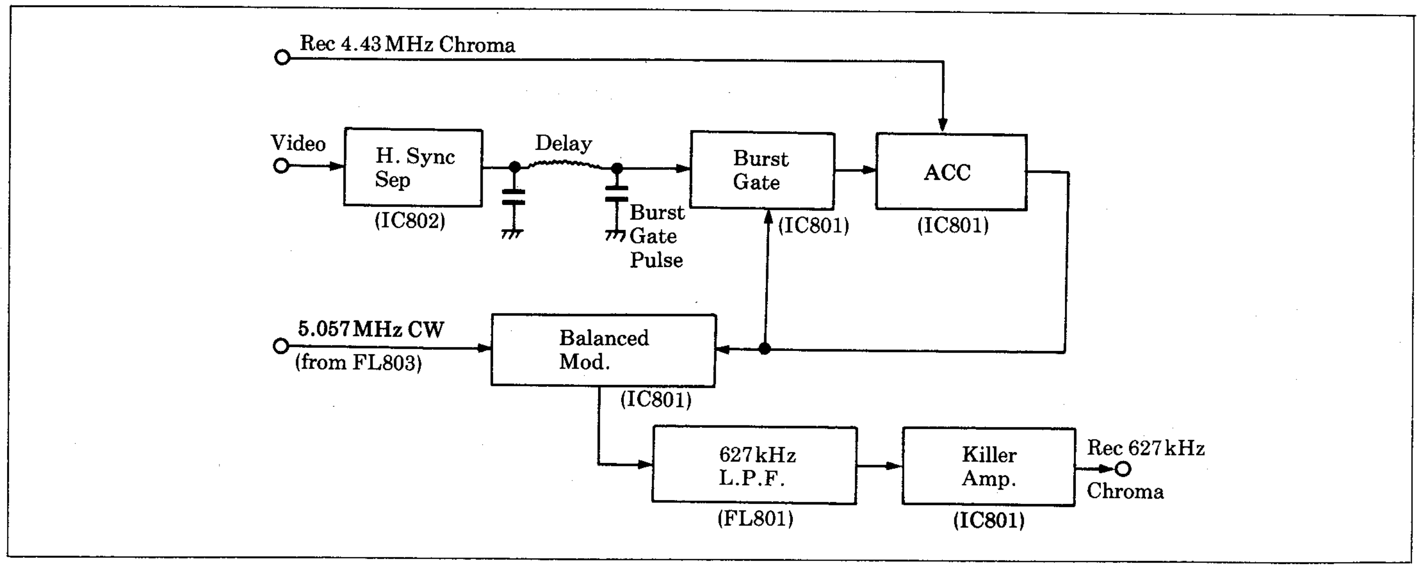
*** 5.060 MHz CW**

The 5.060 MHz CW for the Balanced Modulator (IC801) is produced in the following manner.

Playback 4.43 MHz is applied to the Phase Comparator. The colour phase error is detected by comparing the incoming signal with the 4.43 MHz oscillator. Difference of phase is converted to DC voltage which makes the oscillation frequency of 4.435572 MHz VCO change.

On the other hand, only H syncs are separated from the video signal which appears at JC-(1). The 2.500 MHz VCO is controlled by the AFC output DC level. By the quarter divider, we can achive a 625 kHz signal.

*** ACC/Bal Mod/Killer Amp (IC801)**



Rec 4.43 MHz Chroma
Video
H. Sync Sep
(IC802)
Delay
Burst Gate Pulse
Burst Gate
(IC801)
ACC
(IC801)
5.057 MHz CW
(from FL803)
Balanced Mod.
(IC801)
627 kHz L.P.F.
(FL801)
Killer Amp.
(IC801)
Rec 627 kHz Chroma

Fig. 64

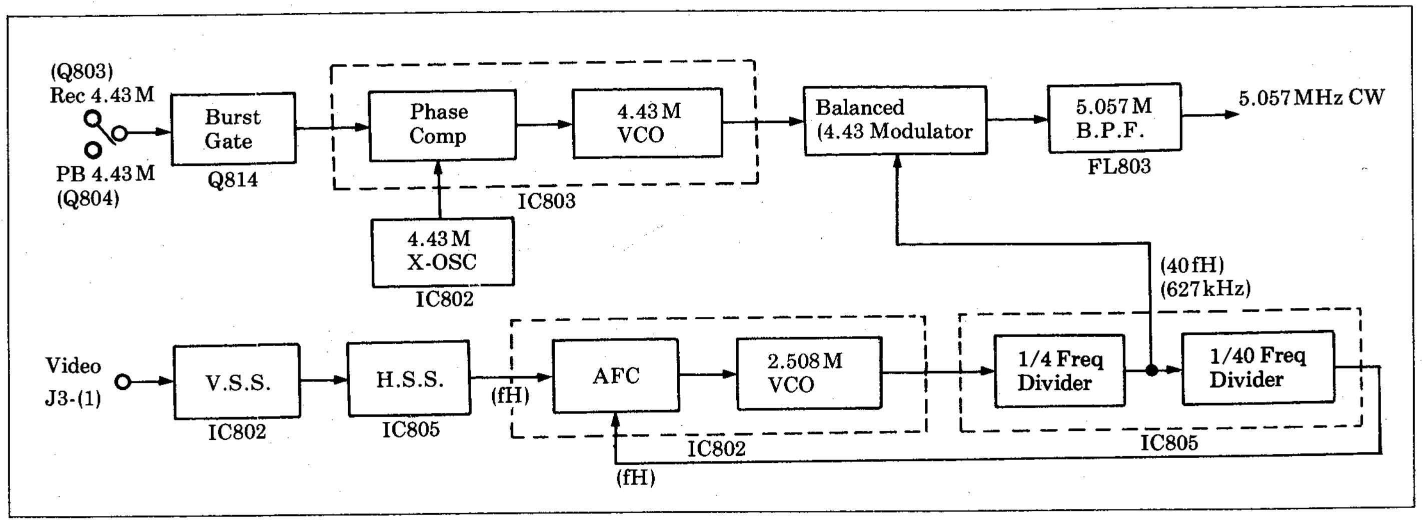

(Q803)
Rec 4.43 M
PB 4.43 M
(Q804)
Burst Gate
Q814
Phase Comp
4.43 M VCO
IC803
4.43 M X-OSC
IC802
Balanced (4.43 Modulator
5.057 M B.P.F.
FL803
5.057 MHz CW
(40 fH)
(627 kHz)
Video J3-(1)
V.S.S.
IC802
H.S.S.
IC805
(fH)
AFC
2.508 M VCO
IC802
1/4 Freq Divider
1/40 Freq Divider
IC805
(fH)

Fig. 65

In the Balanced Modulator, the 625 kHz is hetrodyned against the 4.435572 MHz. Then the summed component (5.060 MHz) and the balanced component (3.811 MHz) will appear at the output. By passing through the 5.060 MHz band pass filter (FL803), only 5.060 MHz will be selected.

- **1/88,672 Freq. Divider**

  In the playback process, the 4.43 MHz X'tal oscillation frequency is divided into 50 Hz. The 50 Hz is used for servo control.
  (In the record process, V syncs are used for servo control).

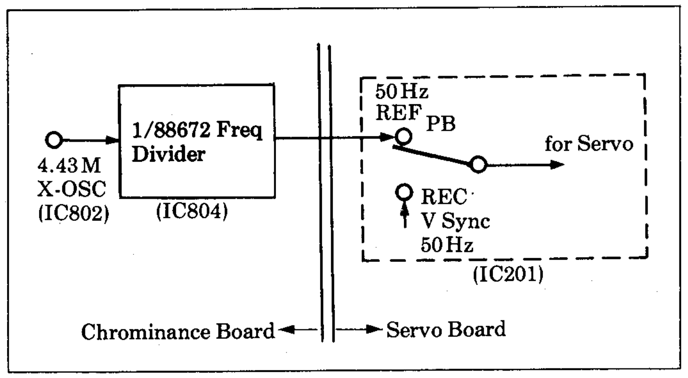

4.43 M X-OSC (IC802)
1/88672 Freq Divider
(IC804)
50 Hz REF
PB
REC
V Sync 50 Hz
for Servo
(IC201)
Chrominance Board
Servo Board

Fig. 66

- **P.B. Colour Killer**

  The colour killer circuit is required to detect a video signal whether it is colour or B/W.
  If the video signal is colour, Q818 is OFF, resulting colour (H) at TP809.

- **Rec Colour Killer**

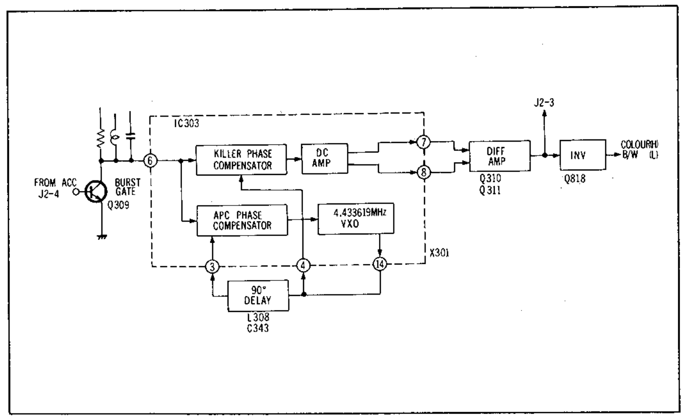

IC303
FROM ACC J2-4
BURST GATE
Q309
KILLER PHASE COMPENSATOR
DC AMP
APC PHASE COMPENSATOR
4.433619MHz VXO
90° DELAY
L308
C343
6
7
8
3
4
14
X301
DIFF AMP
Q310
Q311
J2-3
INV
Q818
COLOUR(H)
B/W (L)

Fig. 68

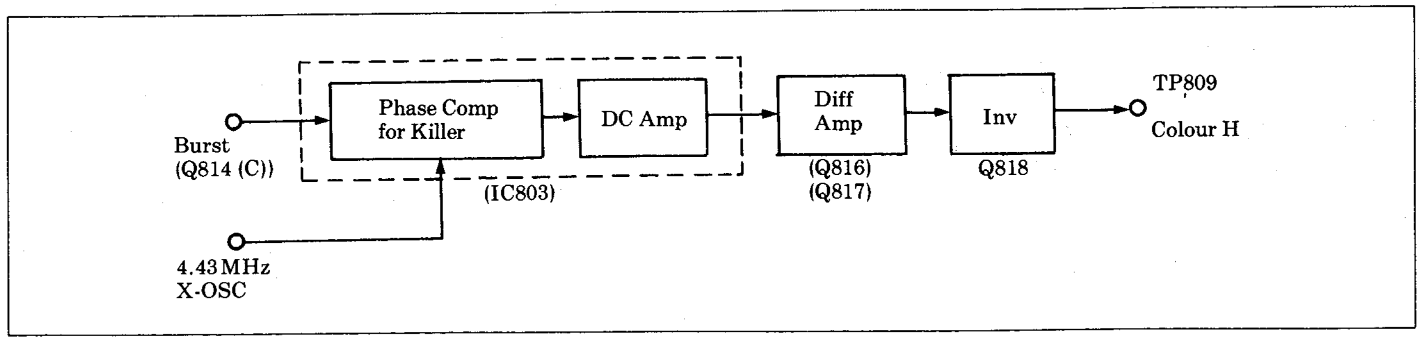

Burst (Q814 (C))
4.43 MHz X-OSC
Phase Comp for Killer
DC Amp
(IC803)
Diff Amp
(Q816)
(Q817)
Inv
Q818
TP809
Colour H

Fig. 67

Chart 4 Chrominance Recording Process

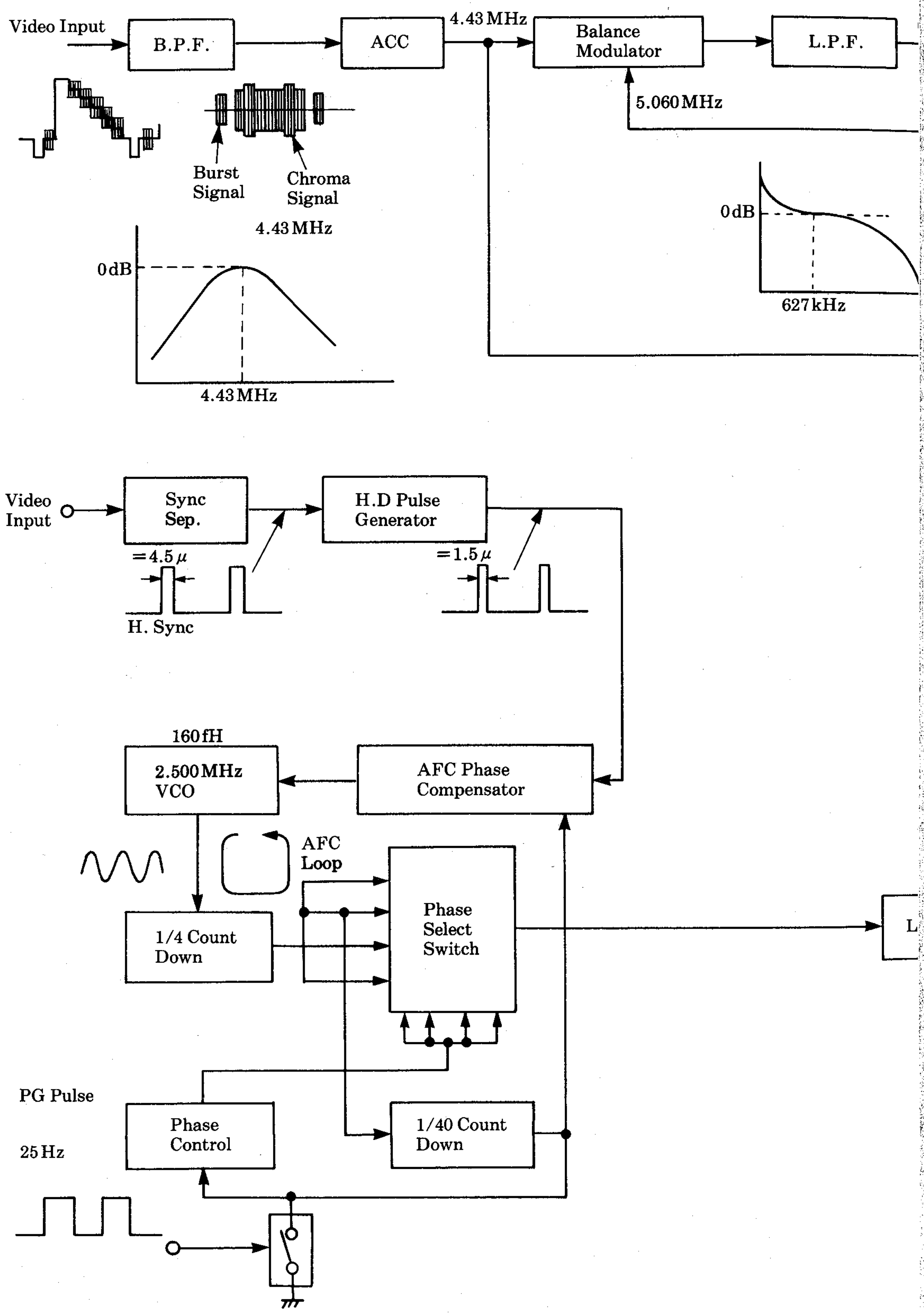

Video Input
B.P.F.
ACC
4.43 MHz
Balance Modulator
L.P.F.
5.060 MHz
Burst Signal
Chroma Signal
4.43 MHz
0 dB
4.43 MHz
0 dB
627 kHz
Video Input
Sync Sep.
=4.5 μ
H. Sync
H.D Pulse Generator
=1.5 μ
160 fH
2.500 MHz VCO
AFC Phase Compensator
AFC Loop
1/4 Count Down
Phase Select Switch
PG Pulse
25 Hz
Phase Control
1/40 Count Down
L

Chart 4 Chrominance Recording Process

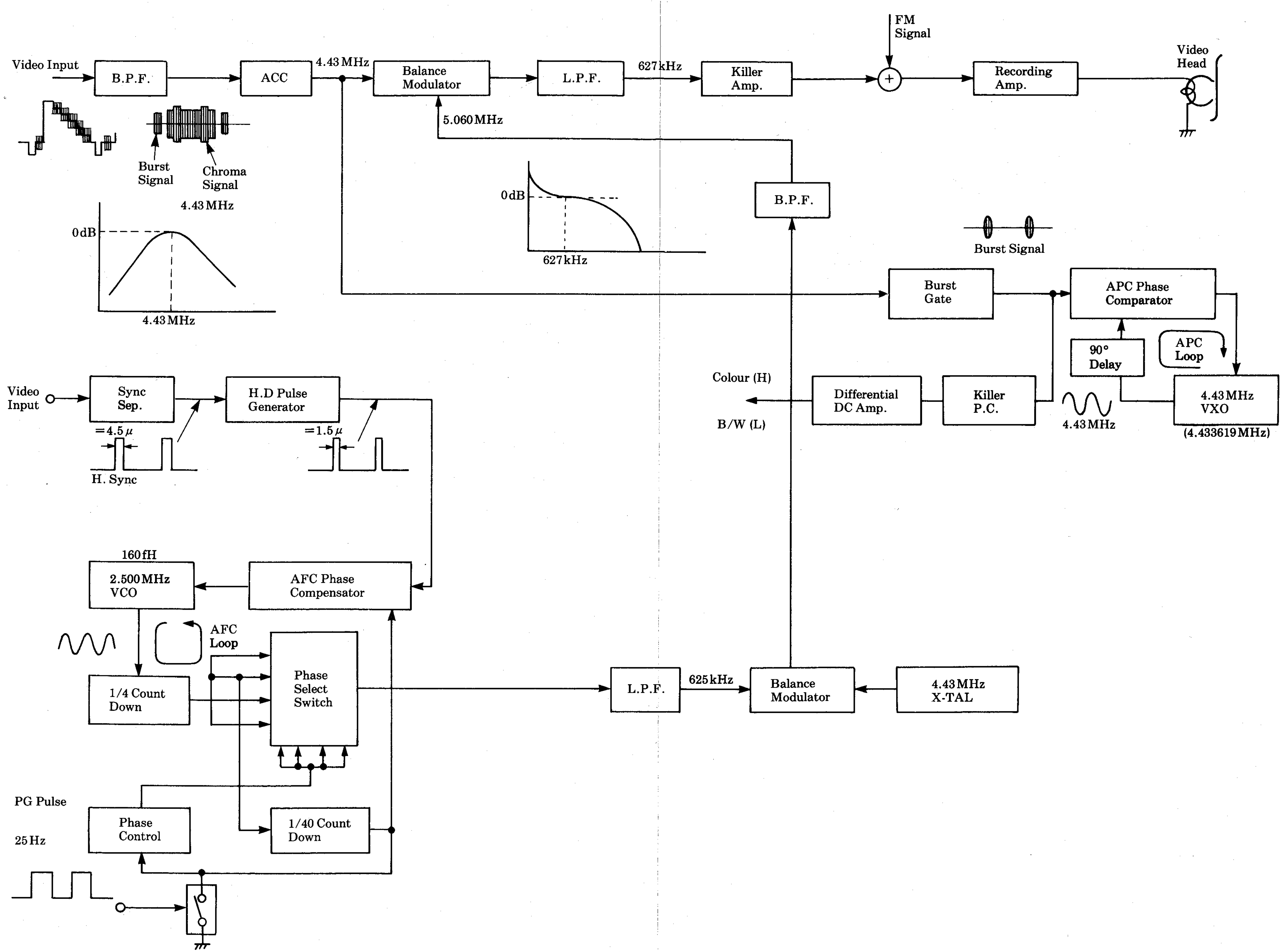
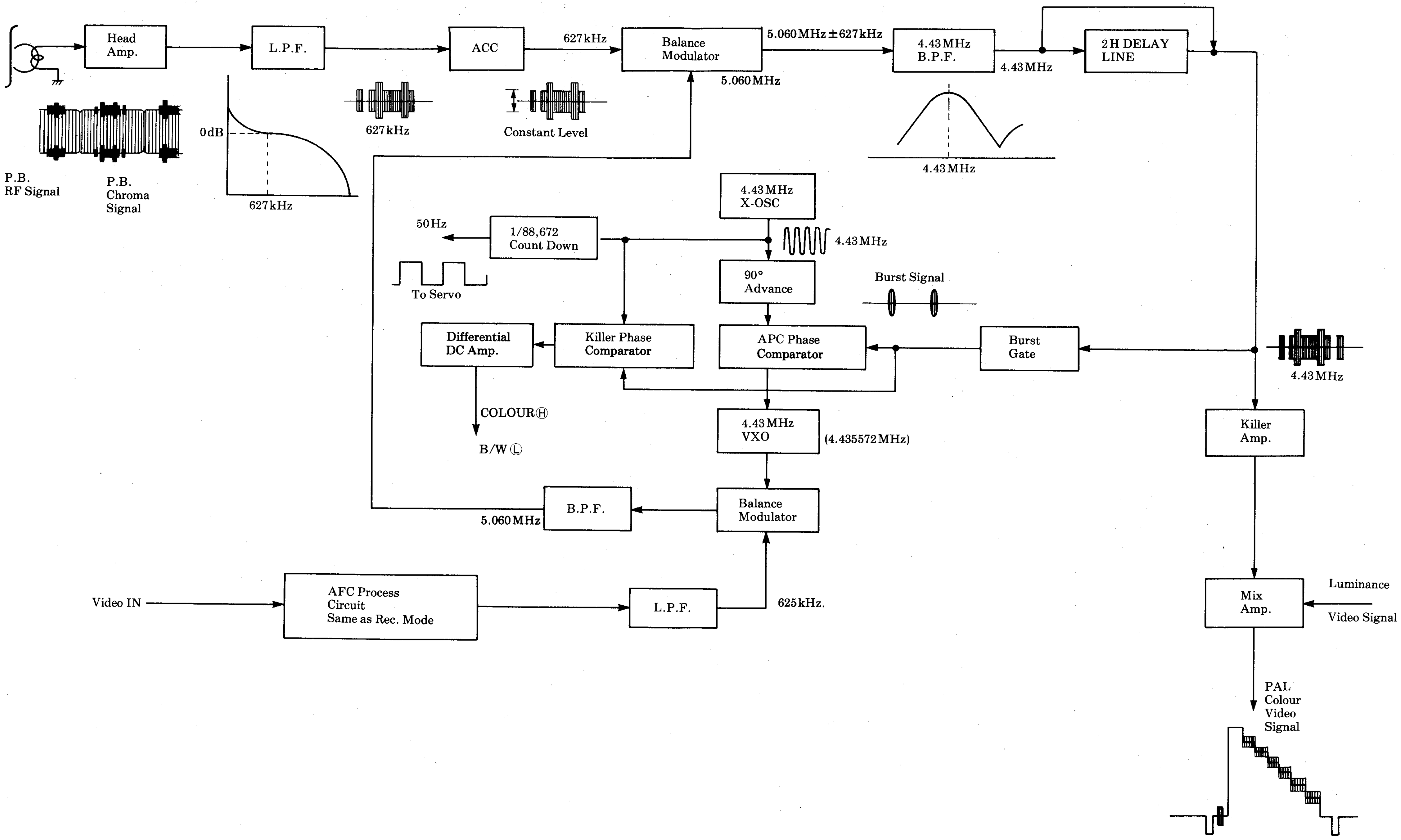
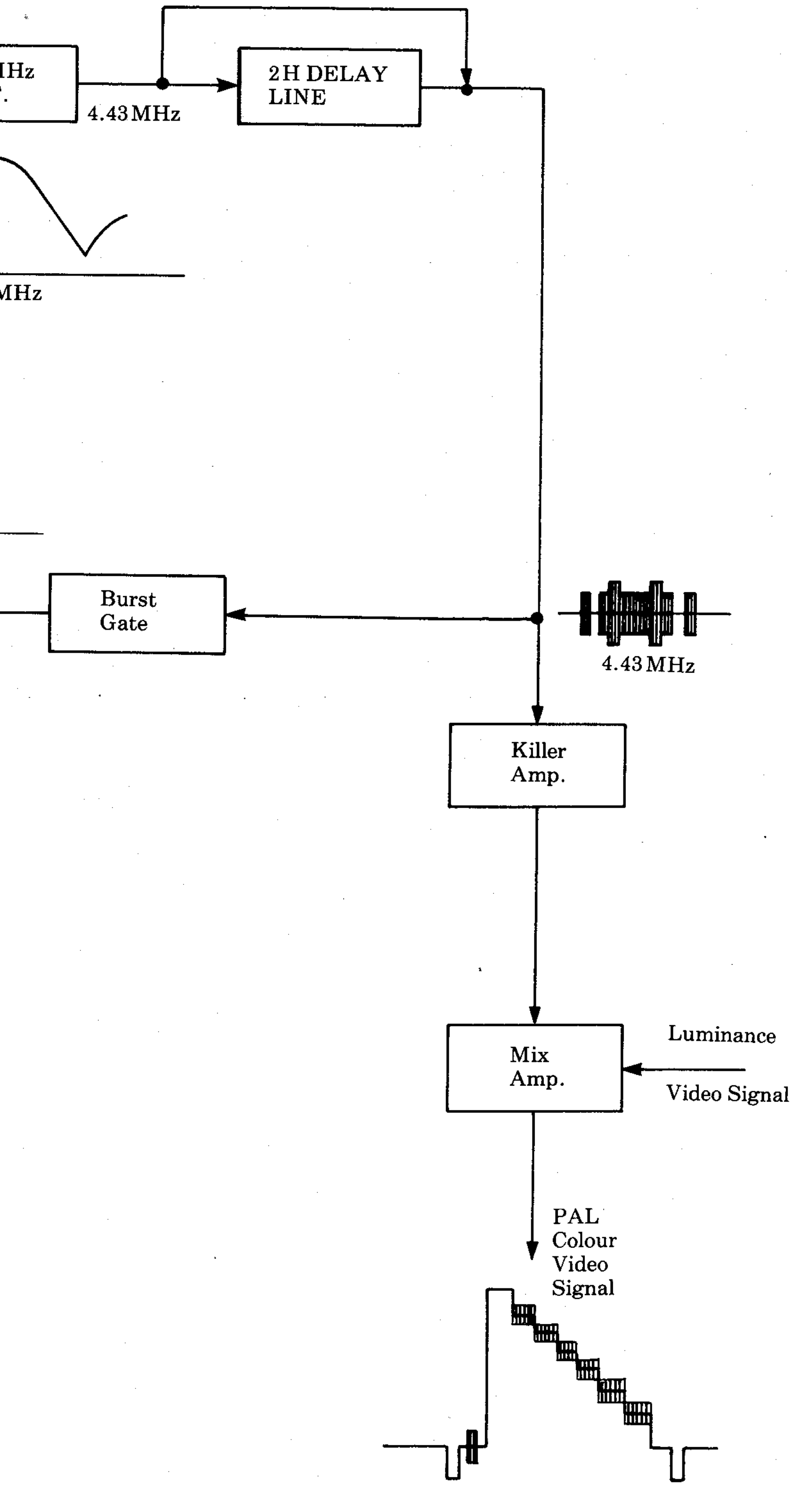

Video Input
B.P.F.
ACC
4.43 MHz
Balance Modulator
L.P.F.
627 kHz
Killer Amp.
FM Signal
+
Recording Amp.
Video Head
Burst Signal
Chroma Signal
4.43 MHz
0 dB
4.43 MHz
5.060 MHz
0 dB
627 kHz
B.P.F.
Burst Signal
Burst Gate
APC Phase Comparator
90° Delay
APC Loop
4.43 MHz VXO
(4.433619 MHz)
4.43 MHz
Killer P.C.
Differential DC Amp.
Colour (H)
B/W (L)
Video Input
Sync Sep.
=4.5 μ
H. Sync
H.D Pulse Generator
=1.5 μ
160 fH
2.500 MHz VCO
AFC Phase Compensator
AFC Loop
1/4 Count Down
Phase Select Switch
L.P.F.
625 kHz
Balance Modulator
4.43 MHz X-TAL
PG Pulse
25 Hz
Phase Control
1/40 Count Down

Chart 5 Chrominance Playback Process


Head Amp.
L.P.F.
ACC
627kHz
Balance Modulator
5.060MHz±627kHz
4.43MHz B.P.F.
4.43MHz
2H DELAY LINE
5.060MHz
P.B. RF Signal
P.B. Chroma Signal
0dB
627kHz
627kHz
Constant Level
4.43MHz
4.43MHz X-OSC
4.43MHz
50Hz
1/88,672 Count Down
To Servo
90° Advance
Burst Signal
Differential DC Amp.
Killer Phase Comparator
APC Phase Comparator
Burst Gate
4.43MHz
COLOUR Ⓗ
B/W Ⓛ
4.43MHz VXO
(4.435572MHz)
Killer Amp.
B.P.F.
5.060MHz
Balance Modulator
Video IN
AFC Process Circuit Same as Rec. Mode
L.P.F.
625kHz.
Mix Amp.
Luminance
Video Signal
PAL Colour Video Signal



Servo Section

MAIN FEATURES

1. Introduction of New IC's

Item	Part No.	Function	Function Detailed
A	AN6340	Cylinder Servo	CYLINDER SERVO (PHASE & SPEED CONTROL), CTL PULSE AMP
B	AN6341	Capstan Servo	CAPSTAN SERVO (PHASE & SPEED CONTROL)
C	AN6811	1/12 Frequency Divider	1/3×1/2×1/2=1/12

2. Relationship between Trapezoid & Sampling Pulse

A. Phase Control

Servo	Trapezoid		Sampling pulse	
	REC	PB	REC	PB
CYL	V Sync	50 Hz Ref. OSC	CTL. PG	CYL. PG
CAP	V Sync	50 Hz Ref. OSC	CAP. FG	CTL PULSE

B. Speed Control

Servo	REC	PB
CYL	Main Coil Sig.	Main Coil Sig.
CAP	CAP. FG	CAP. FG

GENERAL EXPLANATION

Refer to the attached timing chart.

CYLINDER PHASE CONTROL (REC)

V Sync—Trapezoid, Cylinder PG—Sampling Pulse

In the Record mode, television vertical sync is the reference for the cylinder phase servo. Vertical Sync are separated from an incoming video signal in the Luminance Process board (IC301).
The separated V sync signal is applied at Connector P22 (3) on the Servo board (Fig. (a)). In IC201, the 50 Hz is changed to 25 Hz by the flip-flop and converted to the trapezoidal waveform inside the IC. (Fig. (5)).
On the other hand, the sampling pulse is produced in the following manner.
The cylinder PG Head picks up PG pulses (50 Hz) as shown in Fig. (6). Polarity of those pulses is detected by Q211 and send positive pulse to pin 23 of IC201 and negative pulse to pin 24 of IC201. Then negative pulse and positive pulse are sent to MM circuits then made up PG shifter signal as shown in Fig. (8) and (9). Then MM output is sent to Filp-Flop circuit and made duty cycle as shown in Fig. (10). Then the duty cycle is converted to samping pulse by MM and added to trapezoidal so the sampling voltage can be made up.
The sampling voltage is sent to MM circuit of Speed Control (pin 13 of IC201).
On the other hand, the V sync is sent to MM circuit and made into a recording control pulse which will be supplied to control head.

CYLINDER SPEED CONTROL (REC, P.B)

Main Coil Signal—Trapezoid and Sampling Pulse

Reference signal for speed control (200 Hz) is picked up by main coil signal (Q212, 213). The 200 Hz is count down to 100 Hz by Flip-Flop and split to two ways, one signal is sent to MM, and the other is converted to trapezoid generator then the output of MM and output of trapezoid generator are mixed and made into a sampling voltage which is sent to D.D motor Drive circuit.

CAPSTAN PHASE CONTROL (REC)

V Sync—Trapezoid, Capstan FG—Sampling Pulse

V sync is applied to pin 24 of IC201.
The 50 Hz is changed to 25 Hz by Flip-Flop and this signal to converted to trapezoid as shown in (13).
On the other hand, the FG signal is picked up by FG coil (600 Hz). The FG signals is changed to 300 Hz by Flip-Flip (In the IC203).
The 300 Hz output (5 pin of IC203) is sent to IC202 (pin 6) for dividing to 1/12 divider (25 Hz). The 25 Hz (8 pin of IC202) is sent to 15 pin of IC203 and made the sampling pulse as shown in (14).
The trapezoid and sampling pulse is sampled and made into sampling voltage.
The sampling voltage is sent to MM circuit (pin 3 of IC203).

CAPSTAN SPEED CONTROL (REC, P.B)

The capstan FG is applied at connector P21 (2). And the capstan FG picked up 600 Hz sinewave signal. The 600 Hz signal is sent to IC203 (16) and it is changed to 300 Hz by Filp-Flop.

The 300Hz is splitted two ways. One signal is sent to MM circuit and the other signal is sent to trapezoid.
Then the two signals are samples and made into sampling voltage. The sampling voltage is sent to capstan motor drive circuit.

CYLINDER PHASE CONTROL (P.B)

In recording mode, the trapezoid is made up by V sync but in Playback mode. The trapezoid is made up by reference 50Hz signal which is applied to connector P22 (5) and it is sent to IC201 (26) on (20) the other circuit function is same as recording mode.

CAPSTAN PHASE CONTROL (P.B)

In recording mode, the trapezoid is made up by V sync, but in playback mode, it is made up by reference 50Hz signal which is applied to connector P22 (5) as shown in (20).
Also the sampling pulse, in recording mode, it is made up by capstan FG but in playback mode, it is made up by control pulse pin 2 of connector P23 as shown in (17).
Other circuit function is same as recording mode.

Servo Section Timing Chart

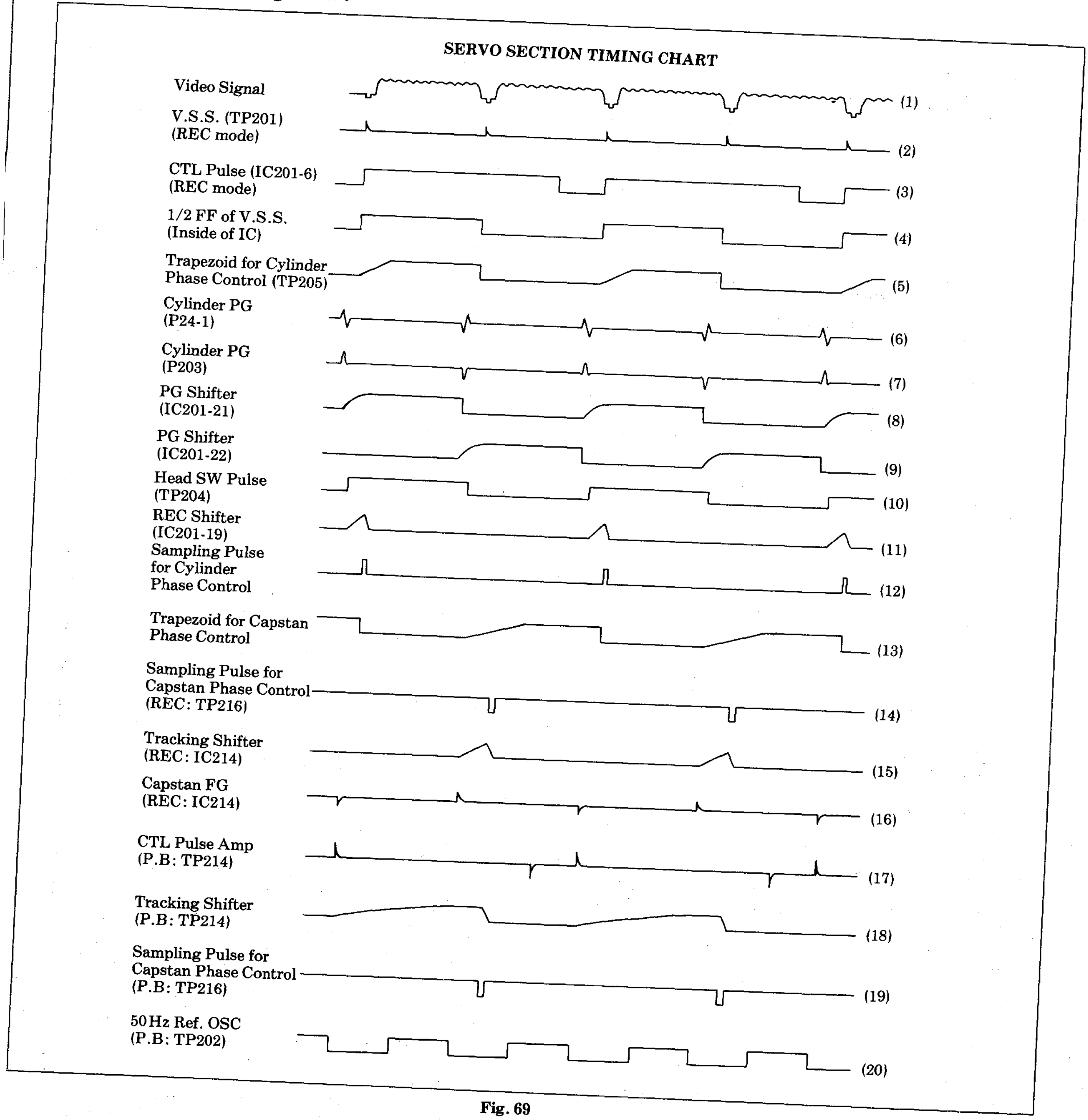
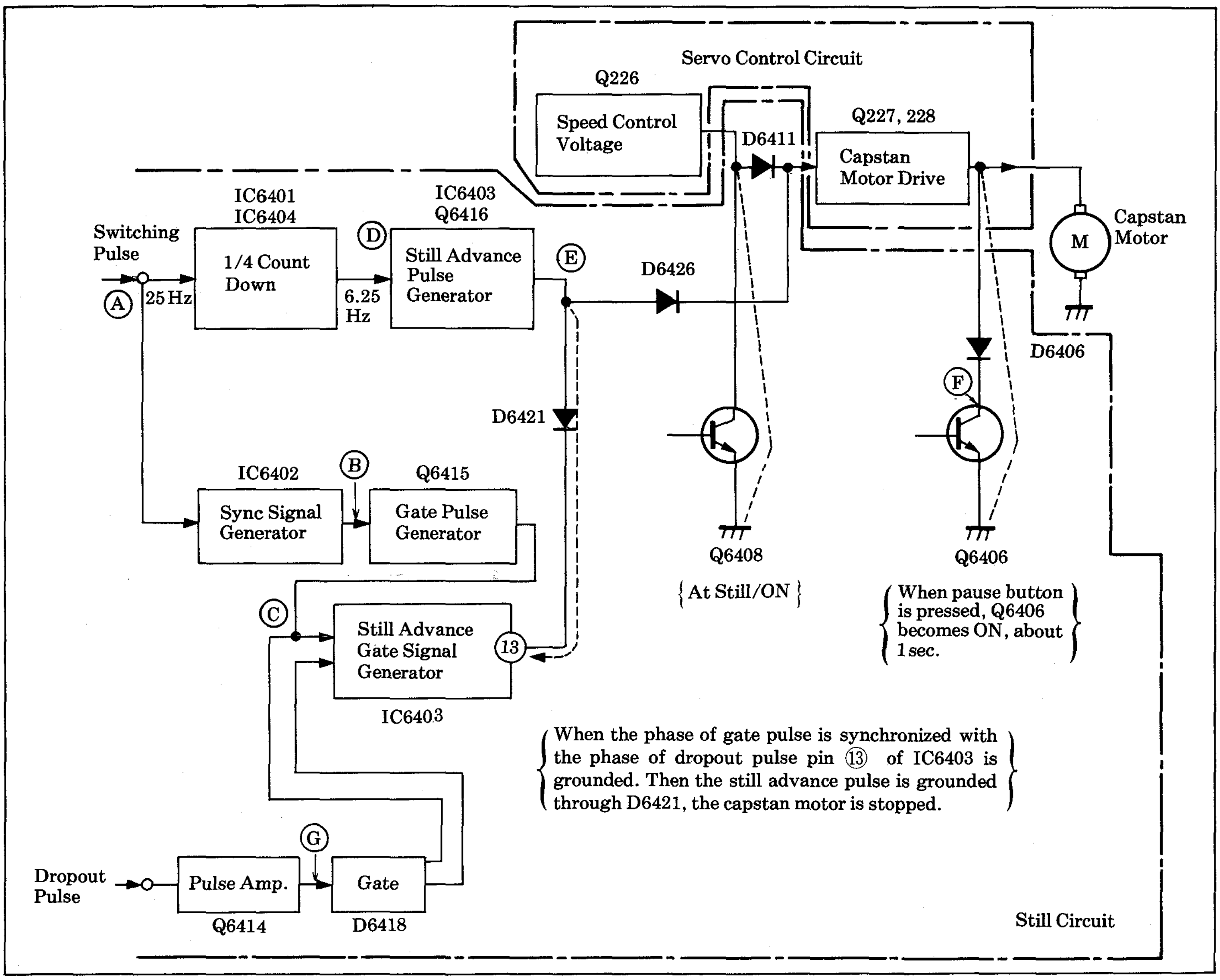

SERVO SECTION TIMING CHART
Video Signal
(1)
V.S.S. (TP201) (REC mode)
(2)
CTL Pulse (IC201-6) (REC mode)
(3)
1/2 FF of V.S.S. (Inside of IC)
(4)
Trapezoid for Cylinder Phase Control (TP205)
(5)
Cylinder PG (P24-1)
(6)
Cylinder PG (P203)
(7)
PG Shifter (IC201-21)
(8)
PG Shifter (IC201-22)
(9)
Head SW Pulse (TP204)
(10)
REC Shifter (IC201-19)
(11)
Sampling Pulse for Cylinder Phase Control
(12)
Trapezoid for Capstan Phase Control
(13)
Sampling Pulse for Capstan Phase Control (REC: TP216)
(14)
Tracking Shifter (REC: IC214)
(15)
Capstan FG (REC: IC214)
(16)
CTL Pulse Amp (P.B: TP214)
(17)
Tracking Shifter (P.B: TP214)
(18)
Sampling Pulse for Capstan Phase Control (P.B: TP216)
(19)
50Hz Ref. OSC (P.B: TP202)
(20)

Fig. 69

Still Circuit Section


Servo Control Circuit
Q226
Speed Control Voltage
D6411
Q227, 228
Capstan Motor Drive
Capstan Motor
M
IC6401
IC6404
IC6403
Q6416
Switching Pulse
A
25 Hz
1/4 Count Down
D
6.25 Hz
Still Advance Pulse Generator
E
D6426
D6406
F
D6421
IC6402
B
Q6415
Sync Signal Generator
Gate Pulse Generator
Q6408
{At Still/ON}
Q6406
When pause button is pressed, Q6406 becomes ON, about 1 sec.
C
Still Advance Gate Signal Generator
13
IC6403
G
Dropout Pulse
Pulse Amp.
Gate
Q6414
D6418
Still Circuit

When the phase of gate pulse is synchronized with the phase of dropout pulse pin ⑬ of IC6403 is grounded. Then the still advance pulse is grounded through D6421, the capstan motor is stopped.

Fig. 70

PURPOSE

When the pause button is pressed in a moment, the still circuit supplies the brake current to the capstan motor, and the tape running is stopped. This brake is released after about 1 sec, then the tape is gradually forwarded by the still advance pulse occurred at the still circuit.

Therefore, the position between the playback video head travel and the recorded track is changed by this pulse, when the noise band (Dropout) occurred in still mode is reached to the vertical blanking portion, the capstan motor is stopped, it is controlled so that the noise band is eliminated on the TV screen.

CIRCUIT DESCRIPTION

In normal playback, the control voltage of capstan motor is supplied from transistor Q226 to the capstan motor drive circuit formed by Q227 and Q228 in the servo control circuit through D6411 in the still circuit.

1. **Capstan Motor Brake Circuit. (Q6406, Q6407)**

   While the normal playback, when the Pause button is pressed, +12 V is supplied to the connector P642-2, it is also supplied to the base of Q6405, Q6405 and Q6404 become ON.

   When Q6404 becomes ON, +12 V is supplied from the collector of Q6404 to the base and emitter of Q6407, Q6407 becomes ON. Further Q6406 becomes ON. The Plus side of capstan motor is grounded, the capstan motor is stopped by the electromagnetic brake.

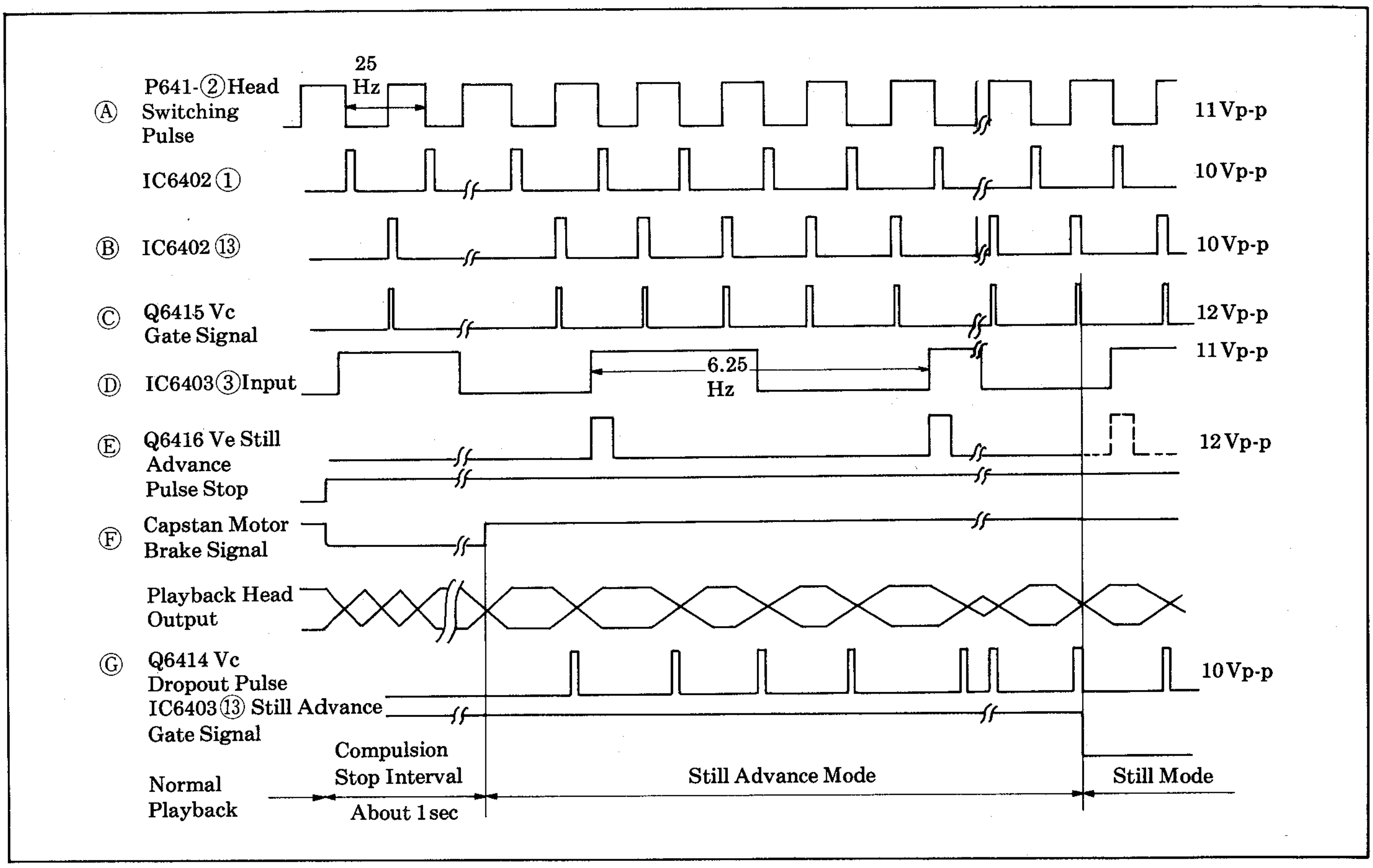

25 Hz
Ⓐ P641-②Head Switching Pulse
11Vp-p
IC6402①
10Vp-p
Ⓑ IC6402⑬
10Vp-p
Ⓒ Q6415 Vc Gate Signal
12Vp-p
Ⓓ IC6403③Input
6.25 Hz
11Vp-p
Ⓔ Q6416 Ve Still Advance Pulse Stop
12Vp-p
Ⓕ Capstan Motor Brake Signal
Playback Head Output
Ⓖ Q6414 Vc Dropout Pulse
10Vp-p
IC6403⑬ Still Advance Gate Signal
Normal Playback
Compulsion Stop Interval
About 1sec
Still Advance Mode
Still Mode

Fig. 71

Q6407 base voltage is increased after about 1sec because of C6402, then Q6407 and Q6406 become OFF, the brake of capstan motor is released.
The collector voltage is shown in Fig. 71, waveform Ⓕ.

2. Capstan Motor Drive Signal Selector Circuit (Q6408)

+12V of the connector P642-2 is also supplied to the base of Q6408.
Then Q6408 becomes ON, the control voltage from Q226 in Servo control circuit is grounded. Therefore, the capstan motor is driven by the signal from D6426.

3. Still Advance Pulse Generator Circuit (IC6401, IC6404, IC6403, Q6416)

When the electromagnetic brake of capstan motor is released, the capstan motor is driven by the still advance pulse, as shown in Fig. 71 Ⓔ, supplied from D6426, the capstan motor is intermittently rotated, the video tape is slowly forwarded.
The still advance pulse is made from the head switching pulse (25 Hz) supplied from the connector P641-2.
This head switching pulse is divided into 1/2 by IC6401 (12.5 Hz).
And the divided pulse is divided into 1/2 by IC6404 (6.25 Hz), again.
This 6.25 Hz pulse is supplied to pin (3) of IC6403 as the gate signal.
The 1/6.25 sec interval negative going pulse is taken out at pin (2) of IC6403. This pulse is supplied to the base of Q6416 and is amplified.
Then, it is supplied to the capstan motor through D6426 and the connector P641-7.

4. Still Advance Gate Signal Generator Circuit (IC6403, Q6414, Q6415, D6418)

The noise band in Still mode is detected as the dropout of envelope waveform in Luminance signal circuit, and this detected dropout pulse is supplied from the connector P641-1 to the base of Q6414, amplifier.
The dropout pulse is supplied to pin (11), or pin (10) of IC6403 through D6418, gate circuit.
On the other hand, the head switching pulse is also supplied to pin (11) of IC6402, the gate pulse Triggered by the rising position of switching pulse is obtained at pin (13) of IC6402 by the monostable multivibrator inside this IC.
This gate pulse is supplied to pin (11) of IC6403 through Q6415, pulse amplifier, and D6418, gate circuit, as shown in Fig. 71 Ⓒ.
Therefore, when the phase of dropout pulse is not synchronized with the phase of gate pulse, D6418 becomes ON, the dropout pulse is not supplied to pin (10) of IC6403. Then, the pin (13) of IC6403 becomes high voltage, the still advance pulse is supplied to capstan motor, and it is intermittently rotated.
But, when the phase of dropout pulse is synchronized with the phase of gate pulse, D6418 becomes OFF, the dropout pulse is supplied to pin (10) of IC6403 for reset signal. Then, the pin (13) of IC6403 becomes 0 (Low) voltage, the still advance pulse is grounded through D6421, the capstan motor is stopped.
Therefore, the noise portion in still mode is synchronized with the position of head switching, the still noise is eliminated on the TV screen.

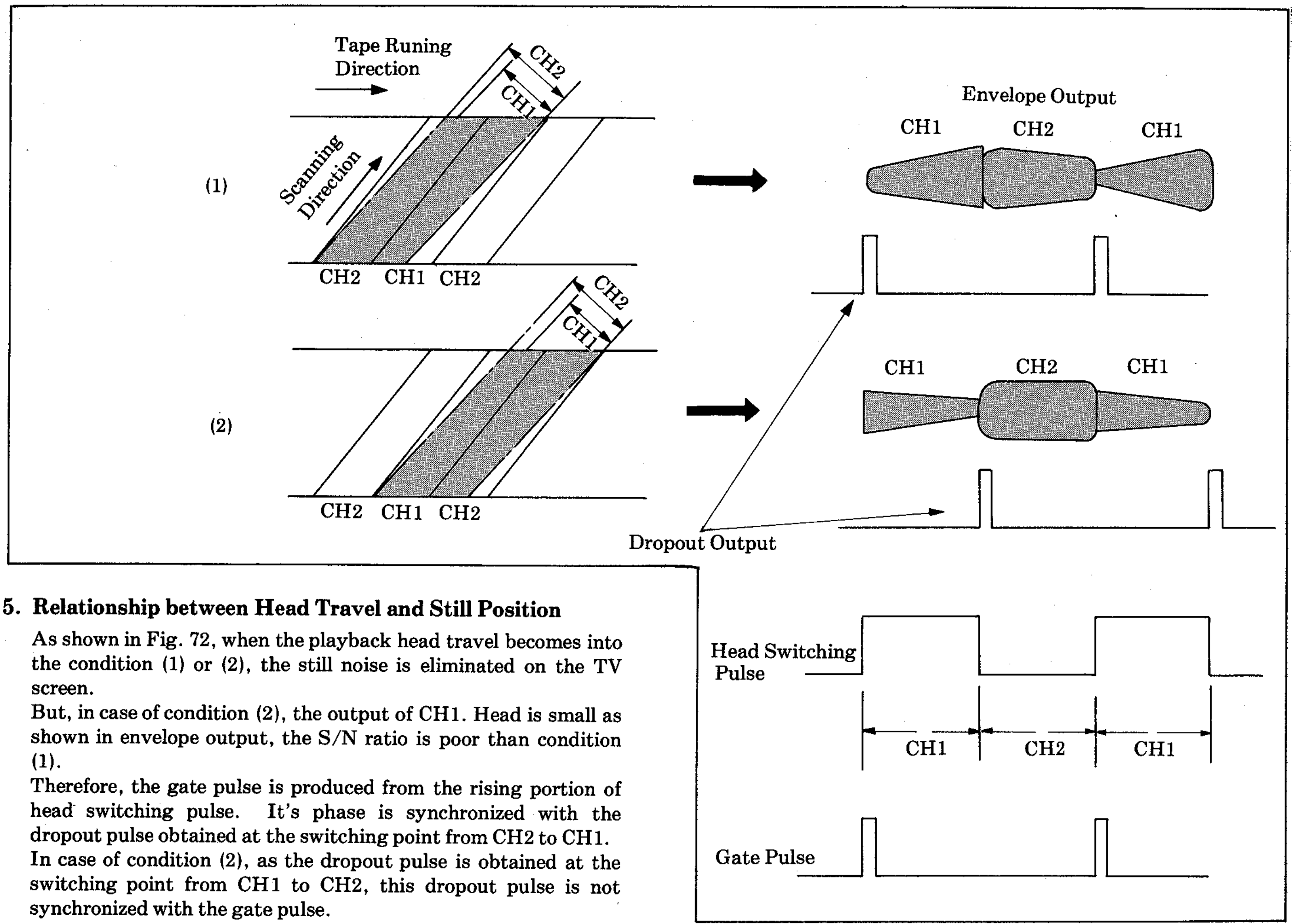

Tape Runing Direction
CH2
CH1
Scanning Direction
(1)
CH2 CH1 CH2
(2)
CH2 CH1 CH2
Envelope Output
CH1
CH2
CH1
CH1
CH2
CH1
Dropout Output
Head Switching Pulse
CH1
CH2
CH1
Gate Pulse

Fig. 72

5. Relationship between Head Travel and Still Position

As shown in Fig. 72, when the playback head travel becomes into the condition (1) or (2), the still noise is eliminated on the TV screen.

But, in case of condition (2), the output of CH1. Head is small as shown in envelope output, the S/N ratio is poor than condition (1).

Therefore, the gate pulse is produced from the rising portion of head switching pulse. It's phase is synchronized with the dropout pulse obtained at the switching point from CH2 to CH1.

In case of condition (2), as the dropout pulse is obtained at the switching point from CH1 to CH2, this dropout pulse is not synchronized with the gate pulse.

Then, the tape is forwarded.

6. Dropout Pulse Width Correction Circuit (Q6417, Q6418, IC303)

In case there is excessively a lot of dropout, the dropout pulse width becomes large.

The phase of gate pulse is synchronized at the position that the noiseless picture is not obtained, D6418 becomes OFF, the still advance pulse may be stopped.

Therefore, the dropout pulse width is detected at Q6417 and Q6418, this circuit controlled so that the dropout pulse does not become wide by the feed back to IC302 through the connector P641-4.

The dropout pulse is supplied to the base of Q6417, while the pulse interval, Q6417 becomes ON. In case this pulse width becomes wide, ON interval of Q6417 becomes long, the charging amount of C6415 is increased, the collector voltage of Q6418 becomes high.

This voltage is supplied to pin (6) of IC302.

By being dull, the sensitivity of dropout detection, the pulse width becomes narrow. And, in case the signal is not recorded at all, the control voltage is supplied, as the dropout pulse is not occurred. Therefore, the still advance circuit is operated, the tape is forwarded until the position that there is no dropout.

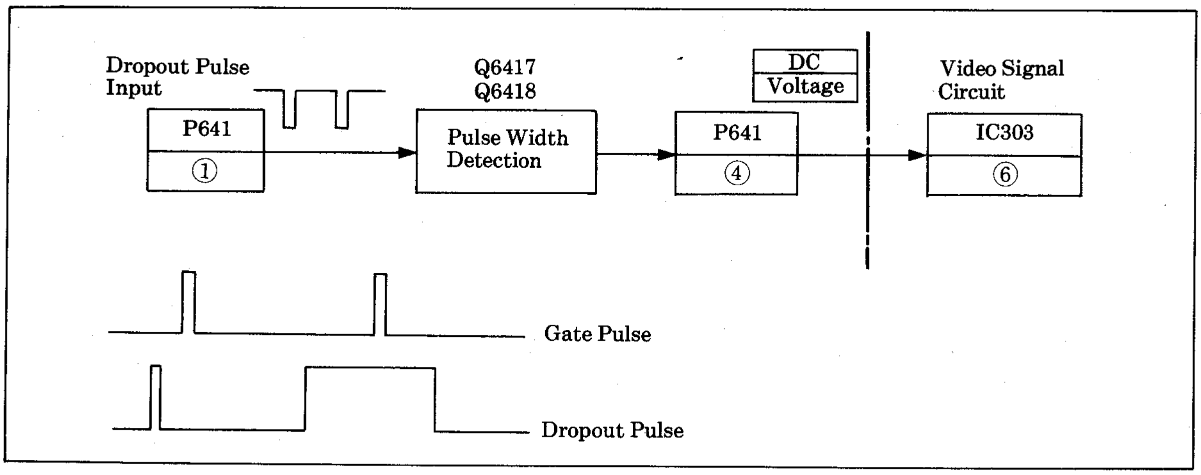

Dropout Pulse Input
P641
①
Q6417
Q6418
Pulse Width Detection
DC Voltage
P641
④
Video Signal Circuit
IC303
⑥
Gate Pulse
Dropout Pulse

Fig. 73

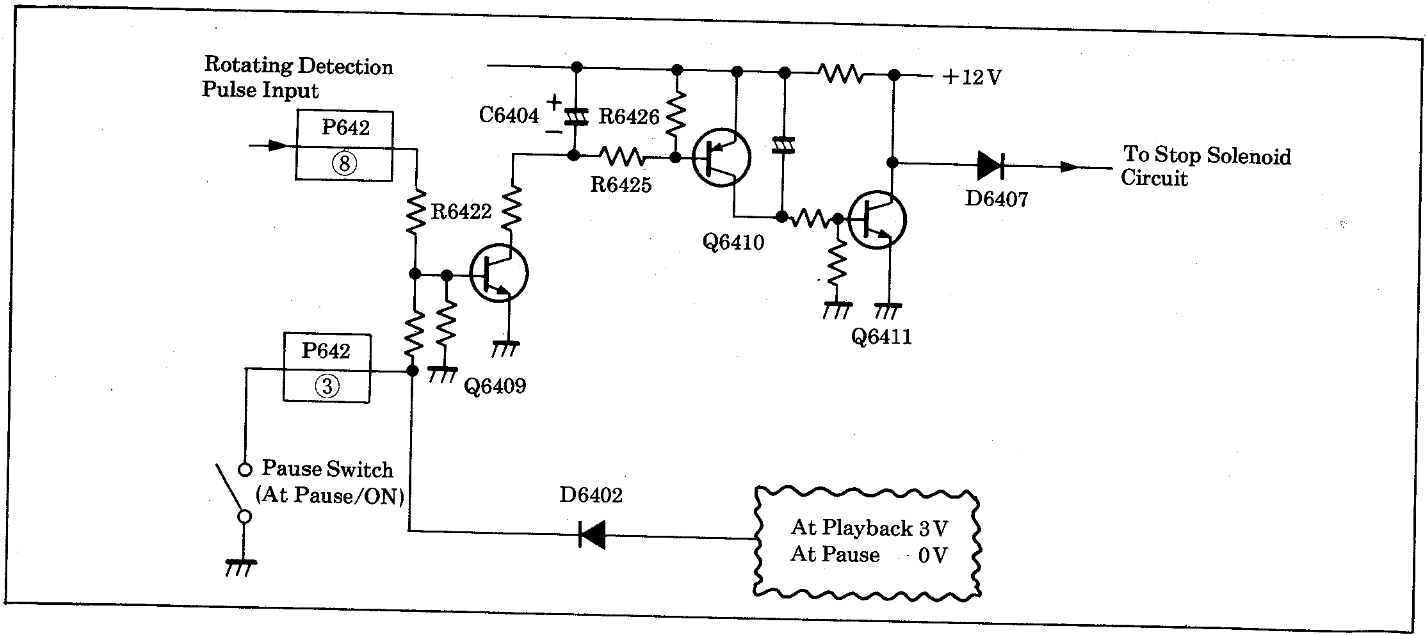

Rotating Detection
Pulse Input
P642
⑧
C6404
R6426
R6425
+12V
To Stop Solenoid
Circuit
D6407
R6422
Q6410
Q6411
P642
③
Q6409
Pause Switch
(At Pause/ON)
D6402
At Playback 3V
At Pause 0V

Fig. 74

7. Automatic Pause Release Mechanism (Q6409, Q6410, Q6411)

When Pause mode passes about 3 min., Q6411 becomes OFF, +12V is supplied to stop solenoid circuit through D6407, and the unit is placed in Stop mode.
While the playback mode, Q6409 becomes ON by the voltage of D6402, C6404 is charged. Then, the base voltage of Q6410 is low, Q6410 becomes ON.
Further, Q6411 becomes ON, the collector of Q6411 is grounded, the stop solenoid is not operated.
Then, when the pause switch is pressed, the base of Q6409 is grounded, Q6409 becomes OFF, the charged voltage of C6404 is discharged through R6426 and R6425.
The base voltage of Q6410 is gradually increased, Q6410 becomes OFF, and Q6411 becomes OFF, the stop solenoid is operated.
But, when the capstan motor is intermittently rotated, the rotating detection pulse is supplied from the connector P642-8 to the base of Q6409, Q6409 becomes ON.
Then, the discharge of C6404 is stopped, automatic pause release mechanism is not operated.

8. One-Shot Frame Circuit (C6306, R6456, D6424)

During the still picture, press the one shot still frame advance button to advance the picture by one frame at a time.
In Pause mode, the pause switch is OFF, +12V is supplied from the connector P643-2 to C6306. At this time, the differential pulse is occurred by R6456 and C6306, when the still frame advance button is pushed.
This pulse is supplied to the capstan motor through D6424, the capstan motor is intermittently rotated.

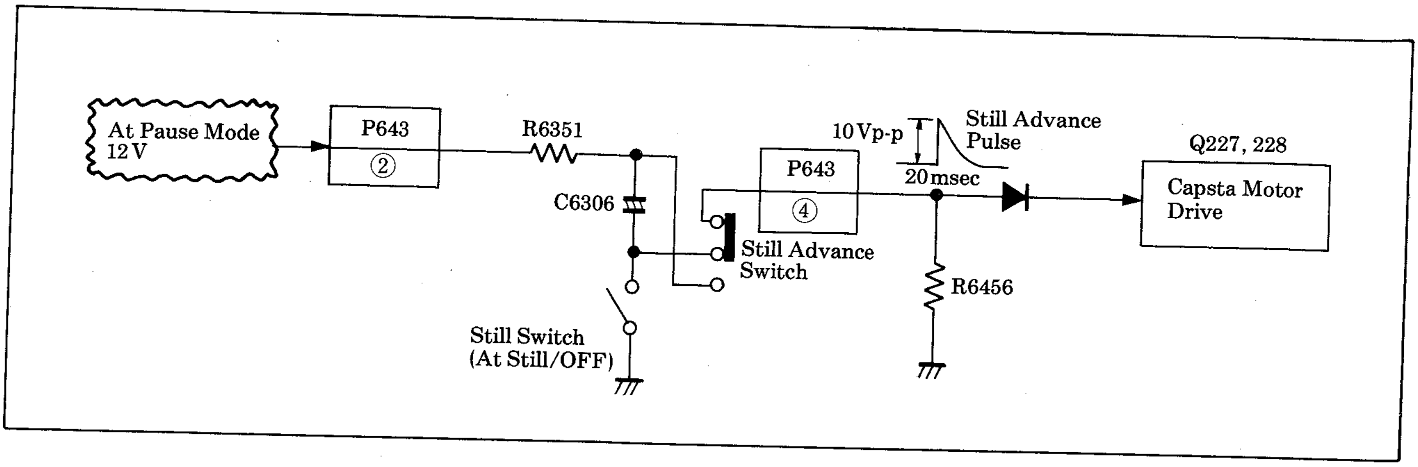

At Pause Mode
12V
P643
②
R6351
C6306
P643
④
10Vp-p
Still Advance
Pulse
20msec
Q227, 228
Capsta Motor
Drive
Still Advance
Switch
R6456
Still Switch
(At Still/OFF)

Fig. 75

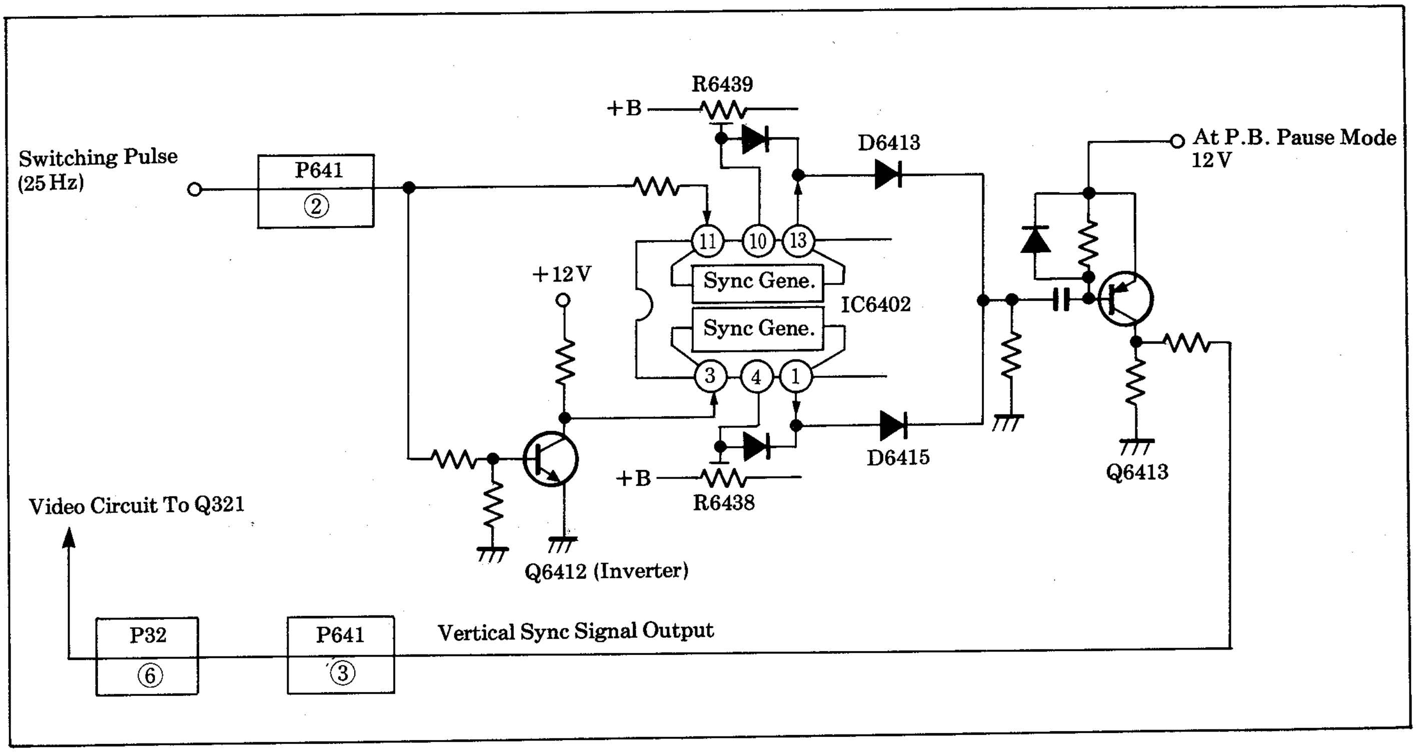

R6439
+B
D6413
Switching Pulse (25 Hz)
P641
②
At P.B. Pause Mode 12V
11
10
13
Sync Gene.
Sync Gene.
IC6402
+12V
3
4
1
D6415
Q6413
+B
R6438
Video Circuit To Q321
Q6412 (Inverter)
P32
⑥
P641
③
Vertical Sync Signal Output

Fig. 76

9. Vertical Sync. Signal Generator Circuit (IC6402, Q6412, Q6413)

In case of still playback, the noise band is occurred around the vertical sync signal, the synchronization is unstability.
Then, the switching pulse is supplied from the connector P641-2 to pin (11) of IC6402. On the other hand, the switching pulse inverted by Q6412 is supplied to pin (3) of IC6402.
Each positive going pulse are occurred by monostable multivibrator inside IC6402.
Those pulses are phase-sifted by R6438 and R6439 comparing with the still noise.
The outputs of pin (1) and (13) of IC6402 are supplied to the base of Q6413.
As Q6413 is operated in Pause mode, the vertical sync signal, 50 Hz, is supplied to video circuit.

ORDER NO. VRD-7904-313

Service Manual

Video Cassette Recorder

Panasonic VHS

NV-8610

Vol. 2

HAUER & MÜLLER
Fernseh Rundfunk - Spezialwerkstatt
Stader Str. 35, 2800 BREMEN 1
Tel. 0421 / 49 83 51 - 52

Trouble Shooting Guide
Electrical Adjustment Procedures
Mechanical Adjustment Procedures

SPECIFICATIONS

Power Source:	NV-8610E, B 110V/127V/220V/240V AC, 50Hz NV-8610EO: 220V AC, 50Hz
Power Consumption:	Approx. 39 watts
Television System:	CCIR: 625 lines, 50 fields PAL colour signal
Video Recording System:	2 rotary heads, helical scanning, VHS system azimuth recording Luminance: FM recordings, 3.8–4.8MHz Colour signal: converted subcarrier phase shift recording, 627kHz
Audio Track:	1 track
Tape:	Tape width 12.7mm, super high density tape
Tape Speed:	23.39mm/sec.
Video Track Width:	0.049mm
Video Head Gap Azimuth:	6°
Audio Track Width:	1.0mm
Control Track Width:	0.75mm
Record/Playback Time:	180 min. with NV-E180
FF/REW Time:	Less than 4.5 min. with NV-E180
Horizontal Resolution:	B/W: more than 300 lines Colour: more than 240 lines
Audio Frequency Response:	80 to 10,000Hz
Signal-to-Noise Ratio:	Video: more than 43dB Audio: more than 43dB
Operating temperature:	5°C to 40°C
Operating Humidity:	10% to 75%
Heads:	Video: 2 rotary heads Audio/Control: 1 stationary head Erase: 1 full track erase 1 audio dubbing erase

Inputs:	Video: 1.0Vp-p, 75Ω unbalanced (BNC) Audio: MIC −70dB, 600Ω unbalanced (M6) LINE −20dB, 100kΩ unbalanced (BNC) Pause remote: Short circuited (M2) Camera remote: (M2) TV tuner: E type: VHF ch. 2–12. UHF ch. 21–69 EO type: VHF ch. E2–M1, M2–U9 UHF ch. 21–69 B type: UHF ch. 21–69 75Ω unbalanced (DIN)
Outputs:	Video: 1.0Vp-p, 75Ω unbalanced (BNC) Audio: LINE −6dB, 600Ω unbalanced (BNC) RF converter: UHF ch. 36±3 75Ω unbalanced (DIN)
Weight:	Approx. 16.5kg
Dimensions:	Approx. 485(W)×176(H)×368(D)mm
Standard Accessories:	Video cassette tape, NV-E120×1 DIN-DIN 75Ω coaxial cable, 2m long×1 Remote pause controller, NV-A181, (6m)×1 Dust cover×1
Optional Accessories:	VHS cassette tape NV-E60 (1 hr) NV-E120 (2 hrs) NV-E180 (3 hrs) B/W video camera, WV-460E (Extension cable and wide-angle adaptor lens are also available.) Portable PAL colour camera, WV-3300E

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Panasonic

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ELECTRICAL ADJUSTMENT PROCEDURES

This section provides complete electrical adjustment procedures which may be required for electronic circuits of PAL VHS video cassette recorder.

1. *Test Equipment*

To make adjustments completely, following equipment is required.

1. V.T.V.M. (Vacuum Tube Volt Meter)
   Voltage Range: 0.001–50V
2. Dual-trace Oscilloscope
   Voltage Range: 0.005–50V/div.
   Frequency Range: DC–10MHz
   Probes: 10 : 1 and 1 : 1
3. Frequency Counter
   Frequency Range: 0–10MHz
4. Signal Generator
   Sinewave: 0–10MHz
5. Sweep Generator
   Frequency Range: 0–10MHz
6. Colour Receiver or Monitor TV
7. Plastic Tip Driver

2. *Adjustment Procedures*

This adjustment procedures consist of the following sections.

1. Power Supply and Transport Control Section.
2. Servo Control Section.
3. Audio Section.
4. Video Section.

2-1. POWER SUPPLY AND TRANSPORT CONTROL SECTION

Before adjusting the Power Supply circuit, be sure check the AC input voltage 220V (NV-8610-E, EO) or 240V (NV-8610-B). Connect a video signal to video input on the rear panel or tune in a local on-air programme, insert a cassette tape, lower the cassette compartment and make a recording. If no power, check the timer switch on the built-in timer first (If the switch is set to "ON" portion, no power is supplied to the unit, even through the power switch is pressed ON).

If no power or no tape movement, regardless of time switch position check the three fuses on the Power Supply circuit board VEP0168A/B.

2-1-1. Transport +12V Power Supply Adjustment

Test Point: TP612
Adjustment: R693 (+12V ADJ).

1. Connect the VTVM to TP612 on the Transport Control circuit board (VEP0669H1).
2. Place the unit in Stop mode.
3. Adjust R693 (+12V ADJ.) for 12.0±0.1V.

2-1-2. Supply Photo Sensor Confirmation

1. Place the unit in Fast Forward mode. Let the tape run till its end.
2. Make sure that when the translucent tape appears in front of the cassette, the Fast Forward button reaches to its normal position.
3. If it does not reach to its normal position, short-circuit CP-1 on the Transport Control circuit board (VEP0669H1).
4. And re-confirm the above item 2.

2-1-3. Take-up Photo Sensor Confirmation

1. Place the unit in Rewind mode. Let the tape run till its beginning.
2. Make sure that when the translucent tape appears in front of the cassette, the Rewind button reaches to its normal position.
3. If it does not reach to its normal position, short-circuit CP-2 on the Transport Control circuit board (VEP0669H1).
4. And re-confirm the above item 2.

2-2. SERVO CONTROL SECTION

Servo Control adjustment procedures consist of two parts.

A. Adjustment in Playback mode.
B. Adjustment in Record mode.

A. ADJUSTMENTS IN PLAYBACK MODE.

2-2-1. P.G. Head Output Confirmation

Test Point: TP203

1. Connect the oscilloscope to TP203 on the Servo Control circuit board (VEP0289G).
2. Playback the CCIR monoscope section of recorded reference tape.
3. Confirm that the level (Vp) is 1.8Vo-p or more as shown in Fig. 1.

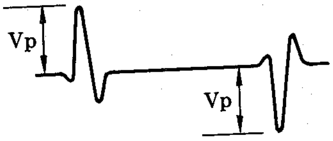


Fig. 1-a

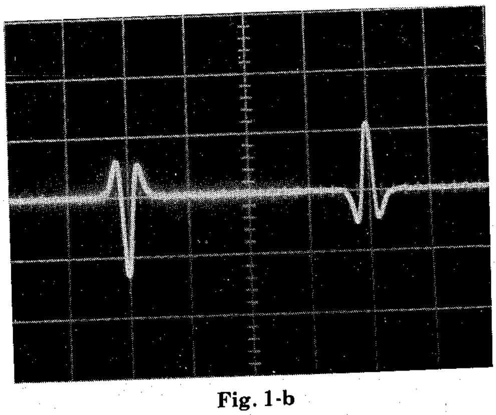


Fig. 1-b

2-2-2. Switching Flip-Flop Duty Cycle Adjustment

Test Points: TP505, TP506
Adjustments: R209 (CY. PG SHIFTER ADJ.)
R211 (CY. PG SHIFTER ADJ.)

1. Connect the jumper wire between TP501 and TP502 on the Rec. & Head Amp. circuit board (VEP0536B).
2. Connect the oscilloscope CH1 to TP505 and CH2 to TP506 on the same circuit board. Use TP505 for trigger of oscilloscope.
3. Playback the CCIR monoscope section of recorded reference tape and set the oscilloscope to the CHOP mode. Then expand the switching portion of the envelope.

4. Now adjust R211 (CY. PG SHIFTER ADJ.) on the Servo Control circuit board (VEP0289G) to place the rising edge of the switching pulse in the center of the overlapped of RF envelope.
5. Then adjust R209 (CY. PG SHIFTER ADJ.) on the Servo Control circuit board to place the falling edge of the switching pulse in the center of the overlapped of RF envelope.
6. Remove the jumper wire.

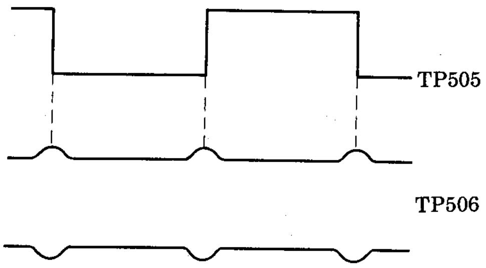


Fig. 2-a

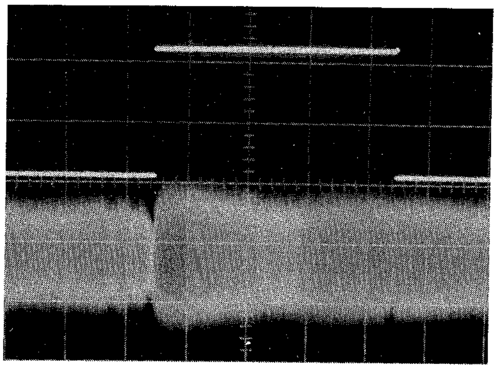


Fig. 2-b

2-2-3. Control Head Output Confirmation

Test Point: TP208

1. Connect the oscilloscope to TP208 on the Servo Control circuit board (VEP0289G).
2. Playback the CCIR monoscope section of recorded reference tape.
3. Make sure that the level (Vc) of positive pulses is more than 1.0 V as shown in Fig. 3.

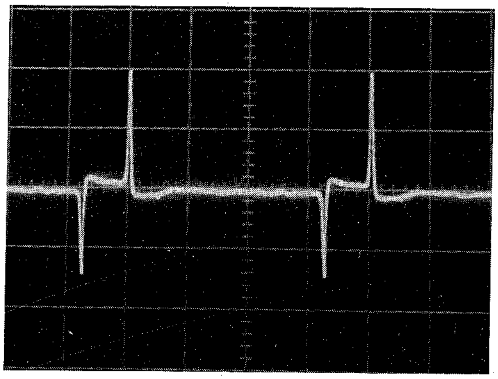


Fig. 3-a

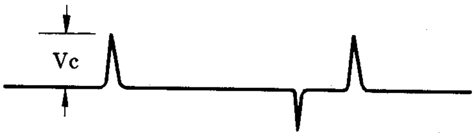


Fig. 3-b

2-2-4. Tracking Fix Adjustment

Test Points: TP204, TP214

Adjustment: R270 (TRACKING FIX ADJ.)

1. Set the Tracking Control on the top panel to the center portion.
2. Connect the oscilloscope CH1 to TP204 and CH2 to TP215 on the Servo Control circuit board (VEP0289G). Use TP204 for trigger of the oscilloscope.
3. Playback the recorded reference tape.
4. During playback, adjust R270 (TRACKING FIX ADJ) so that the phase relationship between TP204 and TP214 becomes as shown in Fig. 4.

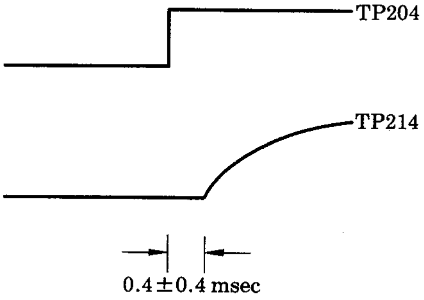


Fig. 4-a

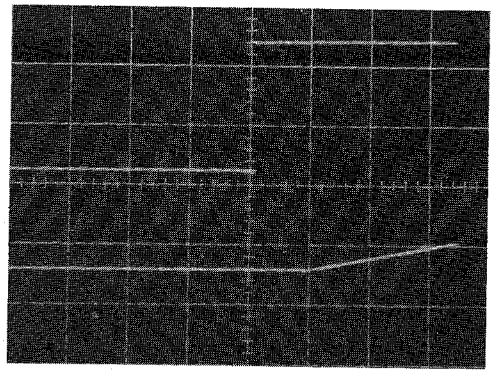


Fig. 4-b

B. ADJUSTMENTS IN RECORD MODE.

2-2-5. Buffer Oscillator Adjustment

Test Point: TP218

Adjustment: R2132 (FREQ. ADJ)

1. Do not supply any video signal to Video Input on the rear panel.
2. Set the Input Selector to Tuner position.
3. Insert a video cassette and place the unit in Rec Play mode.
4. Connect the oscilloscope to TP218 on the Servo Control circuit board (VEP0289G).
5. Adjust R2132 (FREQ. ADJ.) so that the "T", portion becomes 21.05 ± 0.25 msec.
6. Supply a video signal to Video Input on the rear panel.
7. Set the Input Selector to Camera position.
8. Make sure that the "T" portion becomes 20 msec as shown in Fig. 5.

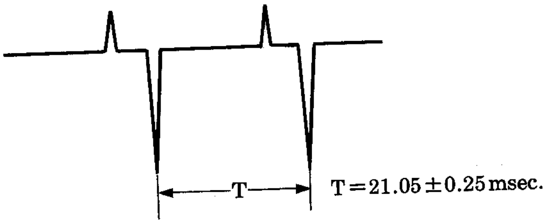


Fig. 5-a

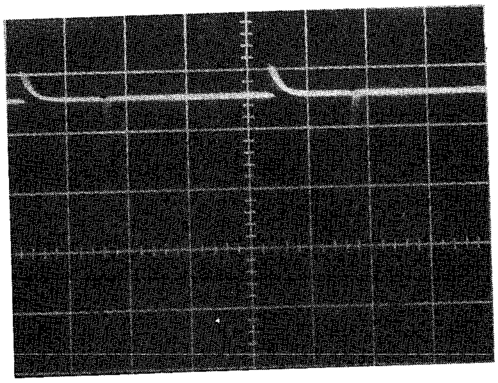


Fig. 5-b

2-2-6. DD Oscillation Level Adjustment

Test Point: TP209

Adjustment: R262 (OSC ADJ)

1. Supply a video signal to the Video Input on the rear panel or tune in a local on-air TV programme.
2. Connect the oscilloscope to TP209 on the Servo Control circuit board (VEP0289G).

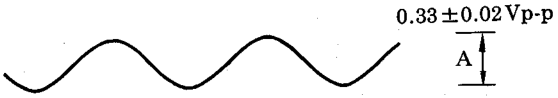


Fig. 6-a

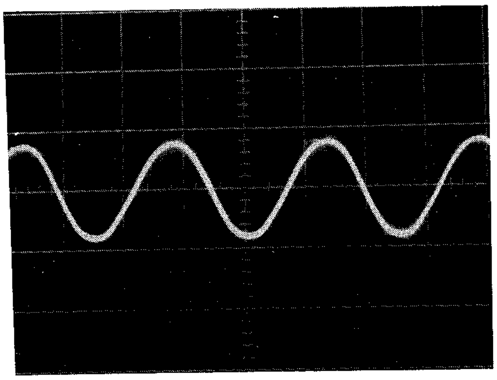


Fig. 6-b

3. Insert a video cassette and place the unit in Rec Play mode
4. Adjust R262 (OSC ADJ) on the same circuit board so that the "A" portion of the waveform is 0.33±0.02Vp-p.

2-2-7. Capstan FG Output Confirmation

Test Point: TP213

1. Supply a video signal to Video Input on the rear panel or tune in a local on-air TV programme.
2. Connect the oscilloscope to TP213 on the Servo Control circuit board (VEP0289G).
3. Insert a video cassette and place the unit in Rec Play mode.
4. Make sure that the level becomes 200—500mV.

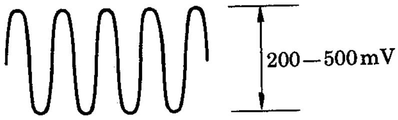


Fig. 7-a

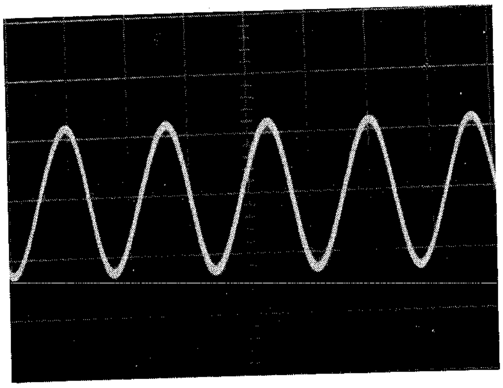


Fig. 7-b

2-2-8. Cylinder Servo Sampling Gate Adjustment

Test Points: TP204, TP205, TP206

Adjustment: R223 (CY. FREE RUN ADJ)

1. Supply a video signal to the Video Input on the rear panel or tune in a local on-air TV programme.
2. Connect the oscilloscope CH1 to TP205 and CH2 to TP204 on the Servo Control circuit board (VEP0289G). Set the oscilloscope to CHOP mode.
3. Insert a video cassette and place the unit in Rec Play mode.
4. Pre-adjust R223 (CY. FREE RUN ADJ) on the same circuit board so that the two waveforms are locked.

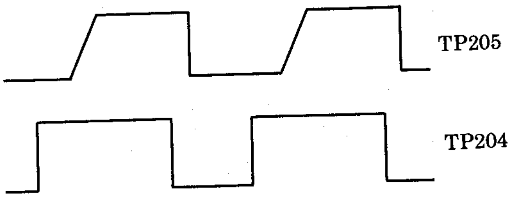


Fig. 8-a

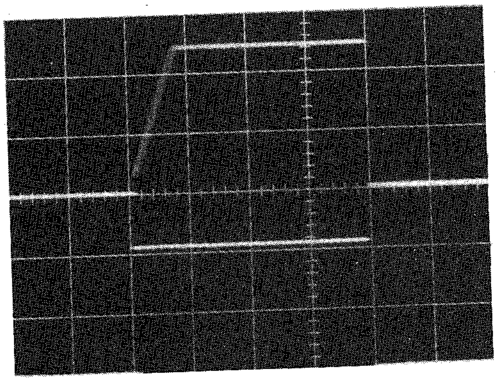


Fig. 8-b

5. Connect the VTVM to TP206 on the same circuit board.
6. Adjust R223 (CY. FREE RUN ADJ) so that the voltage becomes 5±0.2V.

2-2-9. Capstan Servo Sampling Gate Adjustment

Test Points: TP215, TP216, TP217
Adjustment: R2116 (CAP FREE RUN ADJ)

1. Supply a video signal to Video Input on the rear panel or tune in a local on-air TV programme.
2. Connect the oscilloscope CH1 to TP215 and CH2 to TP216 on the Servo Control circuit board (VEP0289G).
   Set the oscilloscope to ADD mode.
3. Insert a video cassette and place the unit in Rec Play mode.
4. Pre-adjust R2116 (CAP FREE RUN ADJ) on the same circuit board so that the sampling pulses are locked on the rising slope of trapezoidal waveform.
5. Connect the VTVM to TP217 on the same circuit board.
6. Adjust R2116 (CAP FREE RUN ADJ) so that the voltage becomes 5±0.2V.

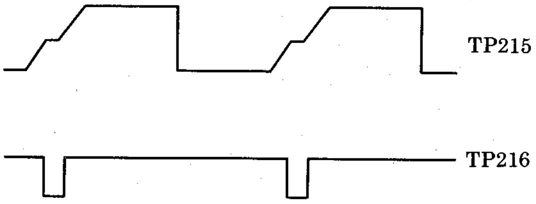


Fig. 9-a

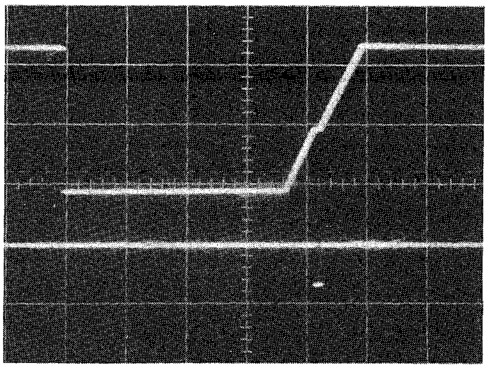


Fig. 9-b

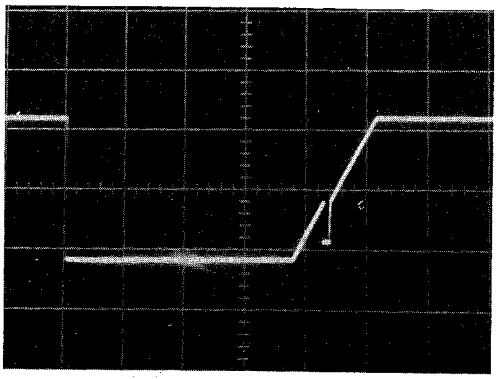


Fig. 9-c

2-2-10. Head Switching Position Adjustment

Test Points: TP204, TP301
Adjustment: R213 (REC SHIFTER ADJ)

1. Supply a video signal to the Video Input on the rear panel or tune in a local on-air TV programme.
2. Connect the oscilloscope CH1 to TP204 on the Servo Control circuit board (VEP0289G) and CH2 to TP301 on the Luminance Process circuit board (VEP0379A).
   Set the oscilloscope to CHOP mode.
3. Insert a video cassette and place the unit in Rec Play mode.
4. Also set the oscilloscope to the Delay mode, and expand the vertical interval of the signal from TP301.
5. While the recording is taking place adjust R213 (REC SHIFTER ADJ) so that the recording head switching point is 6±1H before the start of vertical sync as shown in Fig. 10.
6. Change the slope of oscilloscope from "+" to "−" and make sure that the other switching point is also 6±1H before the beginning of vertical sync. If more or less than 6±1H, re-adjust the switching Flip-Flop Duty Cycle.

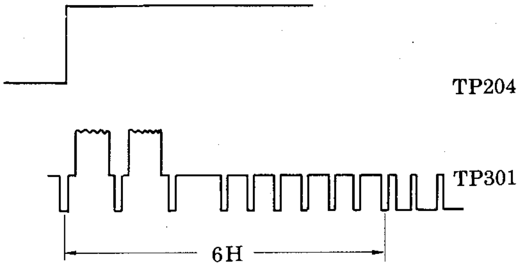


Fig. 10-a

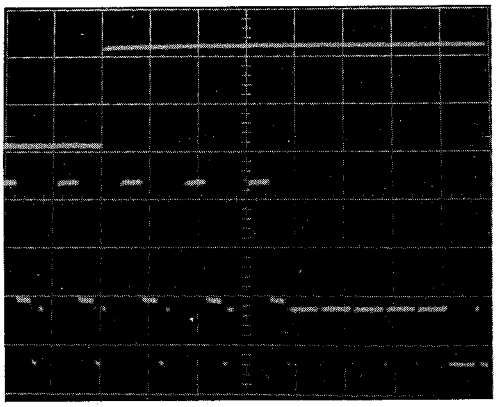


Fig. 10-b

2-3. AUDIO SECTION

Audio adjustment procedures consist of two parts.

A. Adjustment in the Record mode.
B. Adjustment in the Playback mode.

A. ADJUSTMENTS IN THE RECORD MODE.

2-3-1. Bias Leak Confirmation

Test Point: TP402

1. Supply a sinewave signal (1kHz, 0.6Vp-p) to the Audio Input on the rear panel and set the Input Selector on the front panel to CAMERA position.
2. Connect the oscilloscope to TP402 on the Audio circuit board (VEP0442I).
3. Insert a video cassette and place the unit in Rec Play mode.
4. Make sure that the bias leak is 300mV or less as shown in Fig. 11.

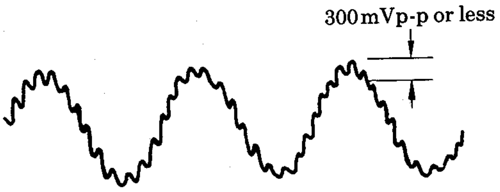


Fig. 11

2-3-2. Bias Current Adjustment

Test Point: Audio Head Portion
Adjustment: C434 (BIAS ADJ)

1. Do not supply any audio signal to the Audio Input on the rear panel. Set the Input Selector on the front panel to CAMERA position.
2. Insert a video cassette and place the unit in Rec Play mode.
3. Connect the VTVM as shown in Fig. 12.
4. While the recording is taking place, adjust C434 (BIAS ADJ) so that the indication of VTVM is 3.6±0.1mVrms.

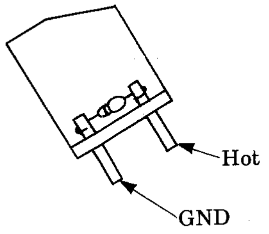


Fig. 12

2-3-3. Bias Oscillator Confirmation

Test Point: Both ends of Full Erase Head

1. Do not supply any audio signal to the Audio Input on the rear panel. Set the Input Selector on the front panel to CAMERA position.
2. Insert a video cassette and place the unit in Rec Play mode.
3. Connect the oscilloscope to the both ends of full erase head, and make sure that the output (V_F) becomes 40Vp-p or more.
4. Also, connect the frequency counter to the both ends of full erase head, and make sure that the indication of frequency counter becomes 67^{+8}_{-5}kHz.

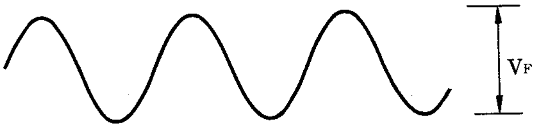


Fig. 13

2-3-4. AGC Confirmation

Test Point: TP401

1. Supply a sinewave signal (1kHz, −10dB) to the Audio Input on the rear panel. Set the Input Selector on the front panel to CAMERA position.
2. Connect the oscilloscope to TP401 on the Audio circuit board (VEP0442E).
3. Insert a video cassette and place the unit in Rec Play mode.
4. Make sure that the audio level is 1.5±0.2Vp-p.

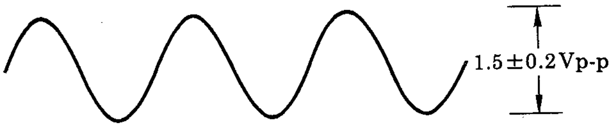


Fig. 14

2-3-5. Audio Dubbing Bias Current Adjustment

Test Point: Audio Head Portion
Adjustment: L404

1. Do not supply any audio signal to the Audio Input on the rear panel.
2. Set the Input Selector on the front panel to CAMERA position.
3. Insert a video cassette and place the unit in Audio Dub mode.
4. Connect the VTVM as shown in Fig. 12.
5. While the audio dubbing is taking place, adjust L404 so that the indication of VTVM is 3.6±0.1Vrms.

B. ADJUSTMENTS IN THE PLAYBACK MODE

2-3-6. Playback Equalizer Adjustment

Test Point: TP401
Adjustment: R404 (P.B. EQ ADJ)

1. Supply sinewave signals (1kHz and 5kHz, 0.06Vp-p) to the Audio Input on the rear panel.
2. Insert a video cassette and record the 1kHz signal at first then the 5kHz signal next.
3. Connect the VTVM to TP401 on the Audio circuit board (VEP0442I).
4. Playback the portion just recorded.
5. Adjust R404 (P.B. EQ ADJ) on the same circuit board so that the 1kHz and 5kHz outputs are balanced.

2-3-7. Playback Gain Adjustment

Test Point: TP401
Adjustment: R405 (P.B. GAIN ADJ)

1. Supply a sinewave signal (1kHz, 0.6Vp-p) to the Audio Input on the rear panel.
2. Connect the VTVM to TP401 on the Audio circuit board (VEP0442I).
3. Insert a video cassette and make a recording. While the recording is taking place, read the voltage (V_1).
4. Playback the portion just recorded. During playback, adjust R405 (P.B. GAIN ADJ) on the same circuit board so that the voltage (V_2) is same as in the Record mode.

2-4. VIDEO SECTION

2-4-1. Head Amp Peak Frequency Adjustment

Test Point: TP506
Adjustments: C514, C516 (PEAK ADJ)
R531, R536 (Q ADJ)

1. Set the output of sweep generator to 100mV at no load, and after that set it to 10mV (−20dB).
2. Supply the above signal to TP507 on the Rec & Head Amp circuit board (VEP0536B).
3. Connect the oscilloscope to TP506 on the same circuit board.
4. Cover the take-up photo transistor with a piece of black tape, and place the unit in Playback mode with no tape in the unit.
5. Adjust R531 (CH2 Q ADJ) and R536 (CH1 Q ADJ) so that the level at 5MHz becomes 4 times bigger than the level at 2MHz.
6. Also adjust C514 (CH2 PEAK ADJ) and C516 (CH1 PEAK ADJ) so that the peaks on the oscilloscope becomes 4.9±0.1MHz.

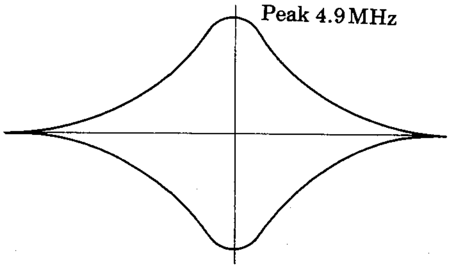


Fig. 15-a

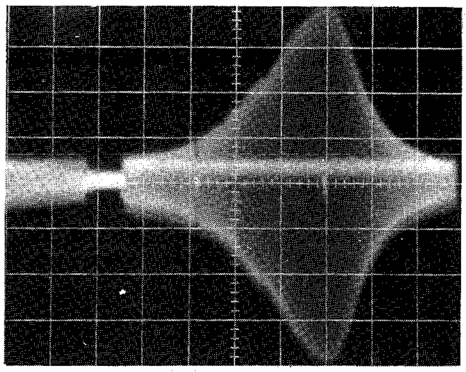


Fig. 15-b

2-4-2. Rec Amp Frequency Response Confirmation

Test Points: TP502, TP504

1. Supply the CCIR monoscope pattern signal to Video Input on the rear panel from sweep generator.
2. Connect a jumper wire between TP306 and ground.
3. Connect the sweep generator to TP307. Put the marker on 1MHz, 2MHz and 3.8MHz.
4. Connect the oscilloscope between TP504 (HOT) and TP502 (GND).
5. Set the output of sweep generator to 150mVp-p at 3.8MHz portion.
6. Make sure that the output waveform becomes as shown in Fig. 16..
7. Place the unit in Rec Play mode and make a recording a few minutes.
8. Remove the jumper wires.

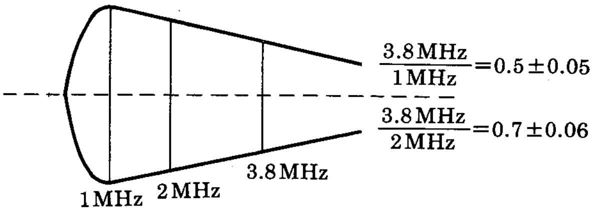

$\frac{3.8\text{MHz}}{1\text{MHz}} = 0.5 \pm 0.05$
$\frac{3.8\text{MHz}}{2\text{MHz}} = 0.7 \pm 0.06$
1MHz
2MHz
3.8MHz

Fig. 16-a

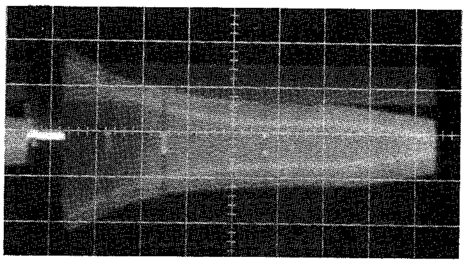


Fig. 16-b

2-4-3. Head Amp Frequency Response MIX Balance Adjustment

Test Point: TP506
Adjustments: R531 (CH2 Q ADJ)
R533 (MIX ADJ)
R536 (CH1 Q ADJ)

1. Set R533 (MIX ADJ) to center portion.
2. Connect the oscilloscope to TP506 on the Head Amp circuit board (VEP0536B).
3. Playback the portion just recorded in item 8 of 2-4-2 (Rec Amp Frequency Response Confirmation).
4. Adjust R536 (CH1 Q ADJ) so that the level of peak frequency is 1.5±0.1 times bigger than level of 2MHz as shown in Fig. 17, by taking aim at CH2.
5. Also, adjust R531 (CH2 Q ADJ) so that the level of peak frequency is 1.5±0.1 times bigger than level of 2MHz by taking aim at CH2.
6. After above adjustments, adjust R533 (MIX ADJ) so that the level of peak frequency becomes equal.

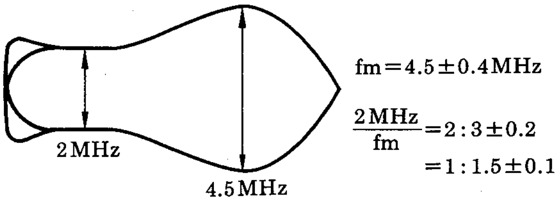


Fig. 17-a

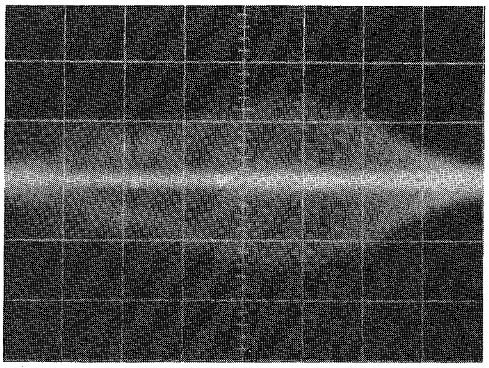


Fig. 17-b

2-4-4. Sync Tip Frequency and Deviation Adjustments

Test Points: TP306, TP312
Adjustments: C320 (SYNC FREQ ADJ)
R316 (DEV ADJ)

Before proceduring the following adjustments, several adjustment connections are required.

a. Connect a jumper wire between pins 3 and 4 of connector J3 on Luminance Process circuit board (VEP0379A) in order to keep the modulator and demodulator turned on at all time.
b. Connect a 1KΩ resistor and 0.01μF (or 0.047μF) capacitor, in series between TP306 and pin 10 of IC302 on the same circuit board. This will feed the modulator output to the demodulator input.
c. Connect a signal generator (sinewave) to TP306 through a 1KΩ resistor and a 0.01μF (or 0.047μF) capacitor.

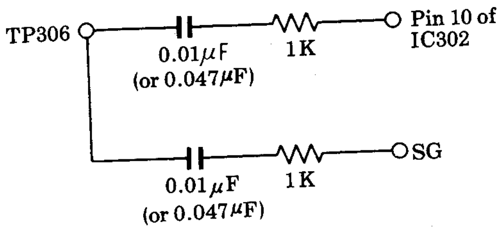


Fig. 18-a

1. Prior to this adjustment, turn R329 (WHITE CLIP ADJ) fully clockwise and R332 (DARK CLIP ADJ) fully clockwise.
2. Supply a B/W stair-step signal to Video Input on the rear panel.
3. Connect the oscilloscope to TP312 on the same circuit board.
4. Set the frequency of signal generator to 3.8MHz.
5. Insert a video cassette and place the unit in Rec Play mode.
6. Adjust C320 (SYNC FREQ ADJ) for minimum carrier leakage at sync tips.

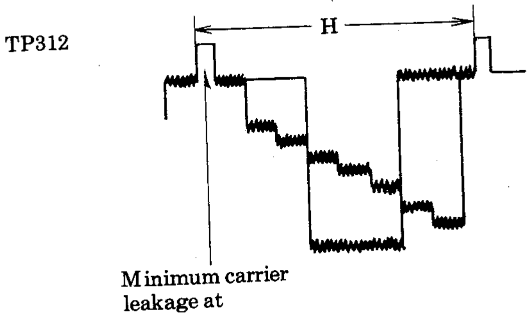


Fig. 18-b

7. Change the frequency of the signal generator from 3.8MHz to 4.8MHz.
8. Adjust R316 (DEV ADJ) for minimum carrier leakage at peak white.
9. Remove the jumpers.

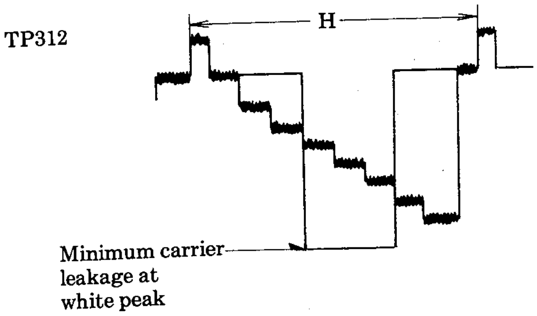


Fig. 18-c

2-4-5. White and Dark Clip Adjustments

Test Point: TP305
Adjustments: R329 (WHITE CLIP ADJ)
R332 (DARK CLIP ADJ)

1. Supply a colour bar signal to the Video Input on the rear panel.
2. Connect the oscilloscope to TP305 on the Luminance Process circuit board (VEP0379A).
3. Insert a video cassette and place the unit in Rec Play mode.
4. Adjust R329 (WHITE CLIP ADJ) and R332 (DARK CLIP ADJ) on the same circuit board so that the over shoot and undershoot becomes as shown in Fig. 19.

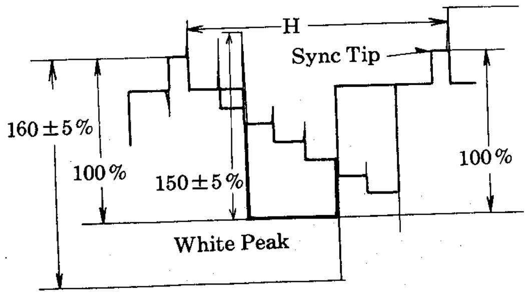


Fig. 19-a

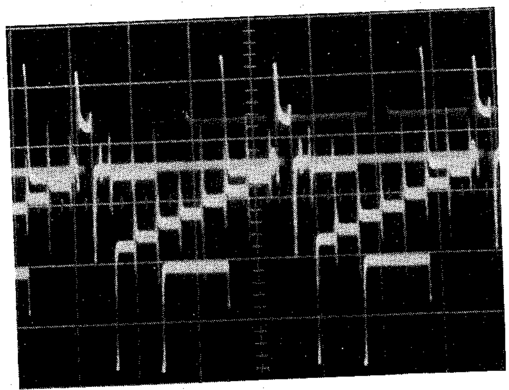


Fig. 19-b

2-4-6. 2.0µsec Pulse Adjustment

Test Points: TP807, TP815

Adjustments: R813 (AFC ADJ)
R899 (2.0µsec PULSE ADJ)

1. Supply a colour bar signal to the Video Input on the rear panel or tune in a local on-air TV programme.
2. Connect the oscilloscope CH1 to TP815 and CH2 to TP807 on the Colour Process circuit board (VEP0846A).
3. Insert a video cassette and place the unit in Rec Play mode.
4. Adjust R899 (2.0µsec PULSE ADJ) so that the "t" portion of 2.0µsec pulse is 2.0 ±0.3µsec as shown in Fig. 20.
5. Also, adjust R813 (AFC ADJ) so that the "T" portion on relationship between TP807 and TP815 waveform becomes 5.5 ±0.5µsec.

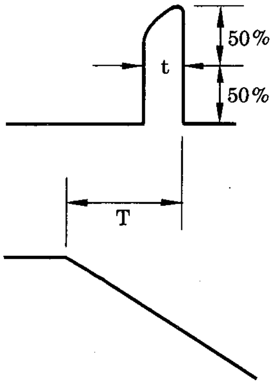


Fig. 20-a

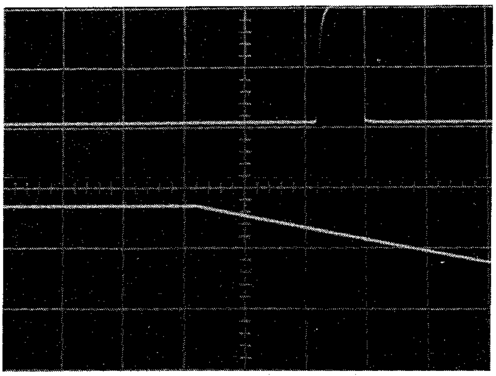


Fig. 20-b

2-4-7. APC Oscillation Frequency Confirmation

Test Point: TP812

Adjustment: R892 (APC ADJ)

1. Supply a colour bar signal to the Video Input on the rear panel or tune in local on-air TV programme.
2. Connect the frequency counter to TP812 on the Colour Process circuit board (VEP0846A).
3. Insert a video cassette and place the unit in Rec Play mode.
4. Adjust R892 (APC ADJ) so that the indication of frequency counter is 4.435572MHz ±10Hz.

2-4-8. 4.43MHz Crystal Oscillator Adjustment

Test Point: TP810

Adjustment: C821 (4.43MHz OSC ADJ).

1. Do not supply any video signal to the Video Input on the rear panel.
2. Connect the frequency counter to TP810 on the Colour Process circuit board (VEP0846A).
3. Place the unit in Stop mode.
4. Adjust C821 (4.43MHz OSC ADJ) so that the indication of frequency counter is 4.433619MHz ±5Hz.

2-4-9. Rec Colour Killer Confirmation

Test Point: TP809

Adjustment: R357 (REC KILL)

1. Supply a colour bar signal to the Video Input on the rear panel.
2. Connect the oscilloscope to TP809 on the Colour Process circuit board (VEP0846A).
3. Connect a jumper wire between TP311 and ground through 47Ω resistor.
4. Insert a video cassette and place the unit in Rec Play mode.
5. Make sure that the DC level at TP809 is High level.
6. Supply a CCIR monoscope signal to the Video Input on the rear panel.
7. Remove the 47Ω resistor.
8. Make sure that the DC level at TP809 is Low level.

2-4-10. PB Colour Killer Adjustment

Test Point: TP809

Adjustment: R8118 (PB KILLER)

1. Supply a colour bar signal to Video Input on the rear panel or tune in a local on-air colour TV programme.
2. Connect a 47Ω resistor in parallel with R3124 on the Luminance Process Circuit Board (VEP0379A).
3. Connect the oscilloscope to TP809 on the Colour Process Circuit Board (VEP0846A) and monitor with the oscilloscope in the DC couple mode.
4. Place the unit in Rec Play mode and make a recording, then playback the just recorded portion.
5. Fully turn R8118 (PB KILLER) counterclockwise, and adjust R8118 just to the point that the DC voltage is changed Low to High on the oscilloscope.
6. Supply a B/W signal to Video Input on the rear panel or tune in a local on-air B/W TV programme.
7. Place the unit in Rec Play mode and make a recording, then playback the just recorded portion.
8. Remove a 47Ω resistor.
9. Make sure that the voltage at TP809 is Low.

2-4-11. Recording Current Adjustment

Test Points: TP502, TP504

Adjustments: R334 (REC CUR ADJ)
R810 (REC CHROMA LEVEL ADJ)

1. Supply a colour bar signal to the Video Input on the rear panel.
2. Fully turn R334 (REC CUR ADJ) counterclockwise.
3. Connect the oscilloscope between TP504 (HOT) and TP502 (GND).
4. Adjust R810 (REC CHROMA LEVEL ADJ) so that the chroma recording current is 32mVp-p.
5. Adjust R334 (REC CUR ADJ) so that the V. sync portion on envelope at TP504 becomes 150mVp-p.

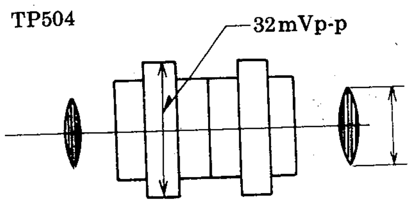

TP504
32mVp-p
Cyan

Fig. 21-a Chroma Record Current

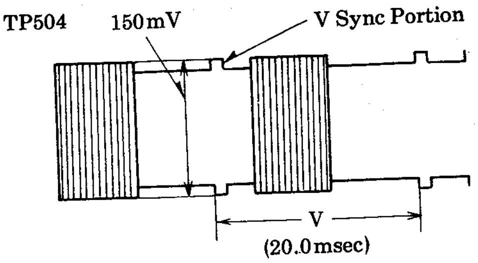

TP504
150mV
V Sync Portion
V
(20.0msec)

Fig. 21-b Luminance Record Current

2-4-12. Dropout Detector Input Level Adjustment

Test Point: TP308
Adjustment: R3137 (RF LEVEL ADJ)

1. Supply a colour bar signal to the Video Input on the rear panel or tune in local on-air TV programme.
2. Connect the oscilloscope to TP308 on the Luminance Process circuit board (VEP0379A).
3. Insert a video cassette and make a recording for a few minutes.
4. Playback the portion just recorded.
5. Adjust R3137 (RF LEVEL ADJ) so that the level becomes 500mVp-p as shown in Fig. 22

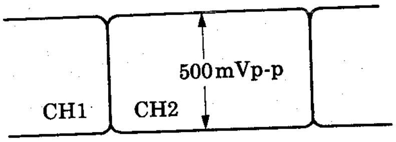

500mVp-p
CH1
CH2

Fig. 22

2-4-13. DL Balance Adjustment

Test Point: TP312
Adjustment: R3151 (DL BAL)

1. Supply a colour bar signal to Video Input on the rear panel or tune in local on-air TV programme.
2. Short-circuit between TP315 and ground.
3. Connect the oscilloscope to TP312 on the Luminance Process Circuit Board (VEP0379A).
4. Insert a video cassette and make a recording for a few minutes.
5. Playback the portion just recorded.
6. During playback, adjust R3151 (DL BAL) so that the carrier leakage (3.8MHz component) becomes minimum, as shown in Fig. 23-c.

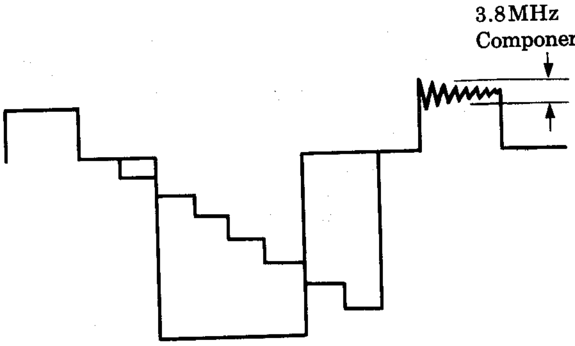

3.8MHz
Component

Fig. 23-a

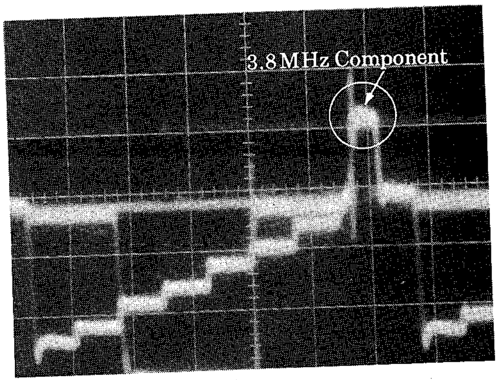

3.8MHz Component

Fig. 23-b

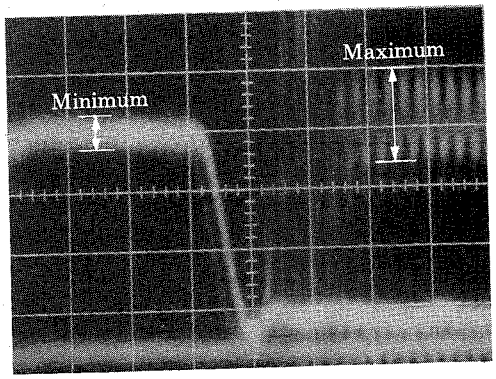

Maximum
Minimum

Fig. 23-c

2-4-14. Limiter Balance Adjustment

Test Point: TP312
Adjustment: R3110 (LIM BAL ADJ)

1. Supply a colour bar signal to Video Input on the rear panel or tune in a local on-air TV programme.
2. Short-circuit between TP216 and ground.
3. Connect the oscilloscope to TP312 on the Luminance Process circuit board (VEP0379A).
4. Insert a video cassette and make a recording for a few minutes.
5. Playback the portion just recorded.
6. During playback, adjust R3110 (LIM BAL ADJ) so that the carrier leakage (3.8MHz component) becomes minimum, 30mVp-p or less.

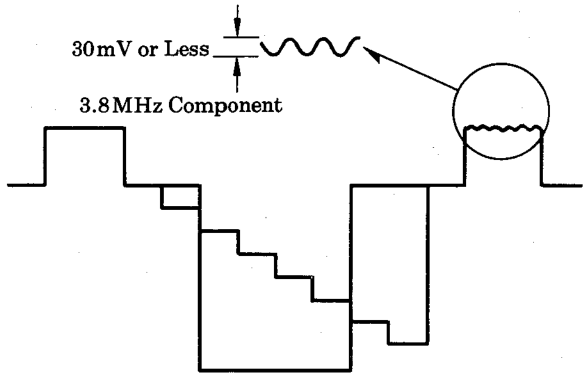


Fig. 24

2-4-15. Video/Chroma Level Adjustment

Test Point: TP314
Adjustments: R383 (VIDEO LEVEL ADJ)
R806 (P.B. CHROMA LEVEL ADJ)

1. Supply a colour bar signal to the Video Input on the rear panel or tune in a local on-air TV programme.
2. Connect the oscilloscope to TP314 on the Luminance Process circuit board (VEP0379A).
3. Insert a video, cassette and make a recording for a few minutes.
4. Playback the portion just recorded.
5. During playback, adjust R383 (VIDEO LEVEL ADJ) so that the video level becomes 2.0±0.05Vp-p.
6. Then, adjust R806 (P.B. CHROMA LEVEL ADJ) on the Colour Process circuit board (VEP0846A) so that the level of cyan portion becomes 1.1±0.05Vp-p as shown in Fig. 25.

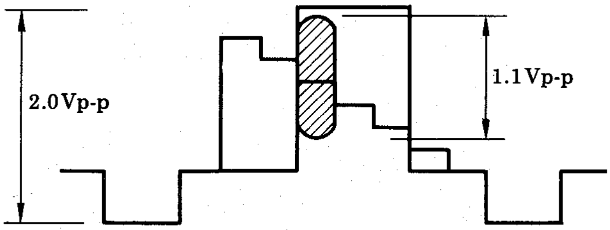


Fig. 25

2-4-16. E-E Level Adjustment

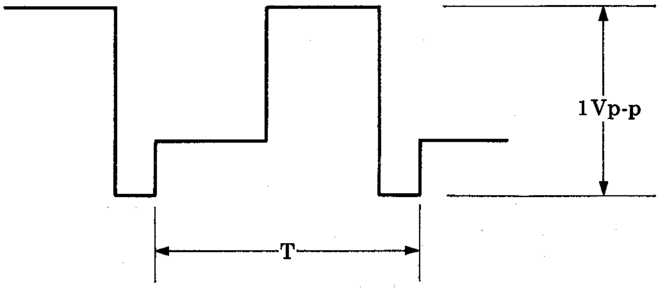
Test Point: TP314
Adjustment: R307 (E-E LEVEL ADJ)

1. Supply a colour bar signal to Video Input on the rear panel or tune in a local on-air TV programme.
2. Connect the oscilloscope to TP314 on the Luminance Process circuit board (VEP0379A).
3. Place the unit in Stop mode.
4. Adjust R307 (E-E LEVEL ADJ) so that the video level becomes 2.0±0.1Vp-p.

2-4-17. Test Signal (H. Frequency) Confirmation for RF Converter

Test Point: TP6701 or Terminal (3) of P611
Adjustment: R6709

1. Do not supply any video signal to Video Input on the rear panel.
2. Place the unit in Stop mode.
3. Connect the oscilloscope to TP6701 or terminal (3) of P611.
4. Adjust R6709 so that the "T" portion becomes 64.0± 0.3μsec as shown in Fig. 26.



T=64.0±0.3μsec.

Fig. 26-a

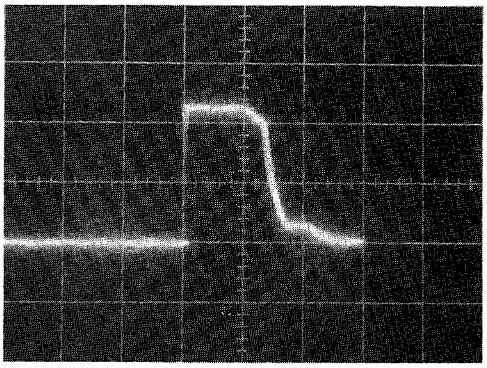


Fig. 26-b

2-5. STILL SECTION

2-5-1. Frame Advance Pulse Width Adjustment

Test Point: TP6402
Adjustment: R6451 (SLOW PULSE)

1. Supply a video signal to Video Input on the rear panel or tune in a local on-air TV programme.
2. Insert a video cassette and make a recording for a few minutes.
3. Play back the portion just recorded in Still mode.
4. Connect the oscilloscope to TP6402 on the Still circuit board (VEP00418A).
5. Adjust R6451 (SLOW PULSE) so that the width "t" is 13±0.2msec as shown in Fig. 27.

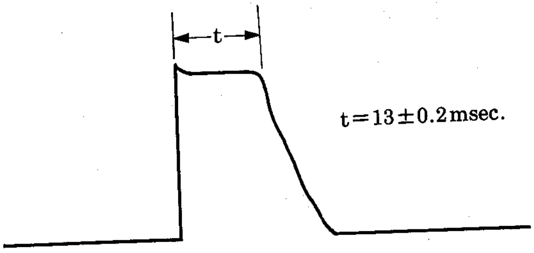


Fig. 27-a

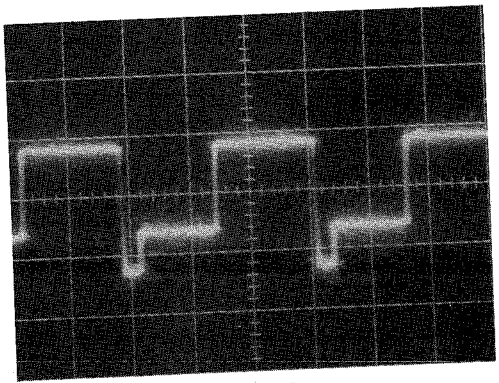


Fig. 27-b

2-5-2. V Sync Phase Adjustment in Still Mode

Test Point: TP204 (CH1), TP314 (CH2)
Adjustment: R6438 (V PULSE 1)
R6439 (V PULSE 2)

1. Supply a video signal to Video Input on the rear panel or tune in a local on-air TV programme.
2. Insert a video cassette and make a recording for a few minutes.
3. Play back the portion just recorded.
4. During playback, press the Pause button and set the unit in Still mode.
5. Connect the oscilloscope CH1 to TP204 and CH2 to TP314 and expand the V sync portion.
6. Adjust R6438 (V PULSE 1) and R6439 (V PULSE 2) as shown in Fig. 28.
   The timing is measured with respect to loading edge of inserted V sync.
7. If vertical jitter appears on a TV screen even through above adjustment is performed, readjust R6439 (V PULSE 2) again until the vertical jitter is removed within ±50μsec.

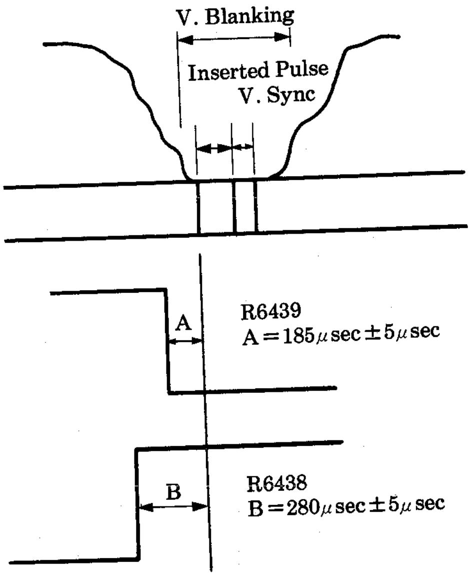


Fig. 28-a

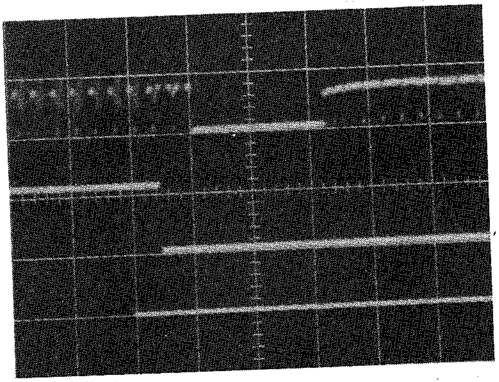


Fig. 28-b

Note:
Depend on the TV, the vertical dancing appears on TV screen, at this time, cut the jumper (W16) on still circuit board.

ADJUSTMENT OF TUNER AND TV DEMODULATOR MODEL VEQ0174D

GENERAL INFORMATION

All adjustments on Signal C.B. VJB0712 can be done from their component side.

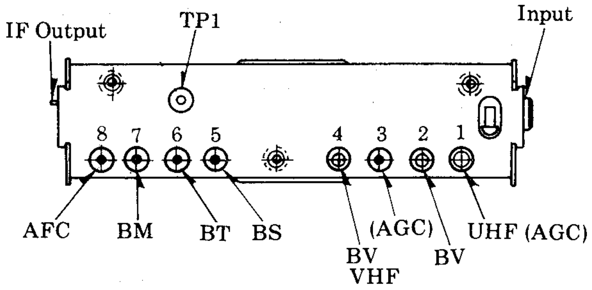
SIGNAL OVERLOAD

Excessive signal from the sweep generator can cause overloading of the receiver circuits causing incorrect adjustment characteristics. To determine that this condition is not present and that the response is a true representation, turn the sweep generator output to zero. Gradually increase the output until a response is obtained. Further increase of the sweep output should not change the configuration of the response except in amplitude.

If the response changes in configuration, such as flattening at the top or dropping below the base line at the bottom, decrease the sweep output to restore the proper configuration. The oscilloscope gain should be set as high as possible to maintain usable pattern with the peak-to-peak values specified, thus requiring a lower output from the sweep generator and less change of overload. Insertion of markers from the signal generator should not cause distortion of response. The markers should be kept as small as possible and still remain visible.

TUNER ADJUSTMENT

Both UHF and VHF tuners are factory preset and normally should not require any adjustment procedure.



Tuner Adjustment

Fig. 1

ADJUSTMENT PROCEDURE:

	STEP	ADJUSTMENT	MARKER GEN
1	Bias Voltage Setting	Set Bias voltage so that waveform on Oscilloscope is always 1 Vp-p.	
2	Adjustment of L1	Adjust for maximum gain at 44 MHz. If waveform exceeds 1 Vp-p set bias voltage again. (Bias voltage should be adjusted always for 1 Vp-p).	36.5 MHz
3	Adjustment of T706	Adjust T706 for maximum gain at 36.5 MHz.	36.5 MHz
4	Adjustment of T701	Adjust T701 for maximum gain at 36.5 MHz.	36.5 MHz
5	Adjustment of T703	Adjust T703 for maximum gain at 36.5 MHz.	36.5 MHz
6	Adjustment of T704, T705 and C714	Adjust T704, T705 and C714 for maximum gain at 36.5 MHz.	36.5 MHz
8	Adjustment of R702 and T702	Insulated adjustment tool should be used. Adjust for minimum gain at 40.4 MHz.	40.4 MHz
9	Adjustment of T707	Adjust T707 for minimum gain at 33.4 MHz.	33.4 MHz
10	Adjustment of R718	Insulated adjustment tool should be used. Adjust R718 for minimum gain at 33.4 MHz.	33.4 MHz
11	Readjustment	Repeat step 8 and 9.	
12	Check IF Overall	Check frequency response. (1) Marker heights of 34.47 MHz and 38.9 MHz are each 50—55% and 35%—55% of total height. (2) Slopes near 34.47 MHz and 38.9 MHz are symmetrical with each other. (See Fig. 3). If response curver is not correct, adjust T704, T705 and C714 slightly.	As indicated in Fig. 3.
13	Readjustment	Repeat step 3 to 9.	
14	Check IF Overall with weak signal	Set bias voltage to about 3 volts, and decrease output level of sweep generator. If great distortion is seen on the waveform, repeat step 3 to 10 and 14. But if the distortion is little, it is allowable.	

1. Sweep Adjustment of Video IF

Test Equipment Connections:

Preliminary:	Short circuit AGC Terminal (VHF tuner) to chassis. Set channel selector to off channel (ch, 10 or 12).
Bias Supply:	Apply 3—4 volts to TP701 VJB0712
Oscilloscope:	Connect as shown in Fig. 2.
VIF Sweep Generator:	Frequency from 31 MHz to 41 MHz and Band Width 10 MHz (See Fig. 3).
Marker Generator:	Couple loosely to sweep generator cable to provide markers.

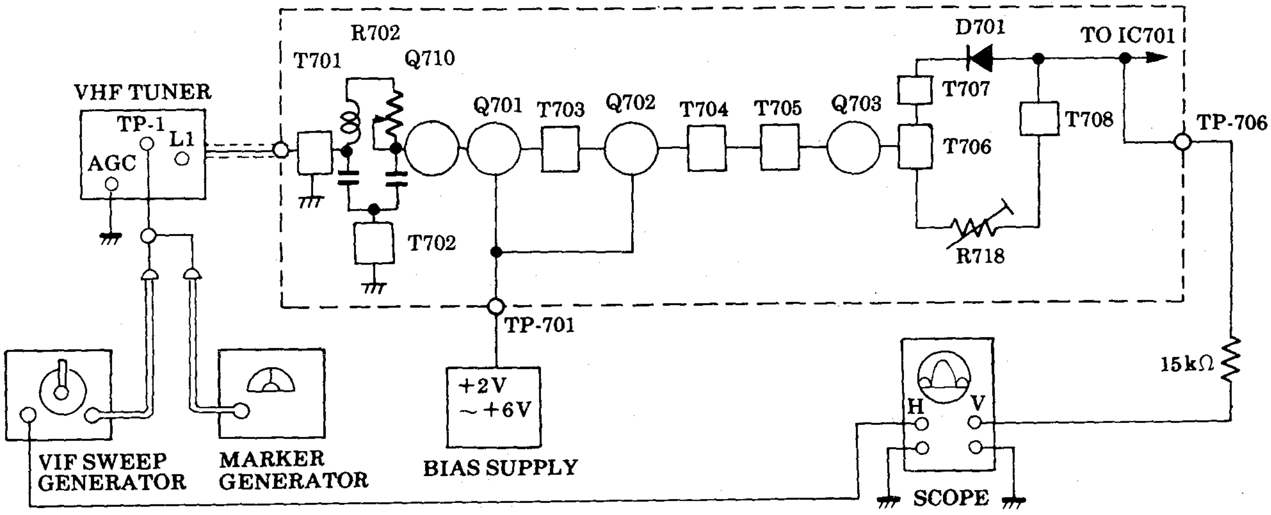

R702
T701
Q710
D701
TO IC701
VHF TUNER
TP-1
L1
AGC
Q701
T703
Q702
T704
T705
Q703
T707
T708
TP-706
T706
T702
R718
TP-701
15kΩ
+2V
~+6V
H
V
VIF SWEEP GENERATOR
MARKER GENERATOR
BIAS SUPPLY
SCOPE

Fig. 2 **Test Equipment Connections**

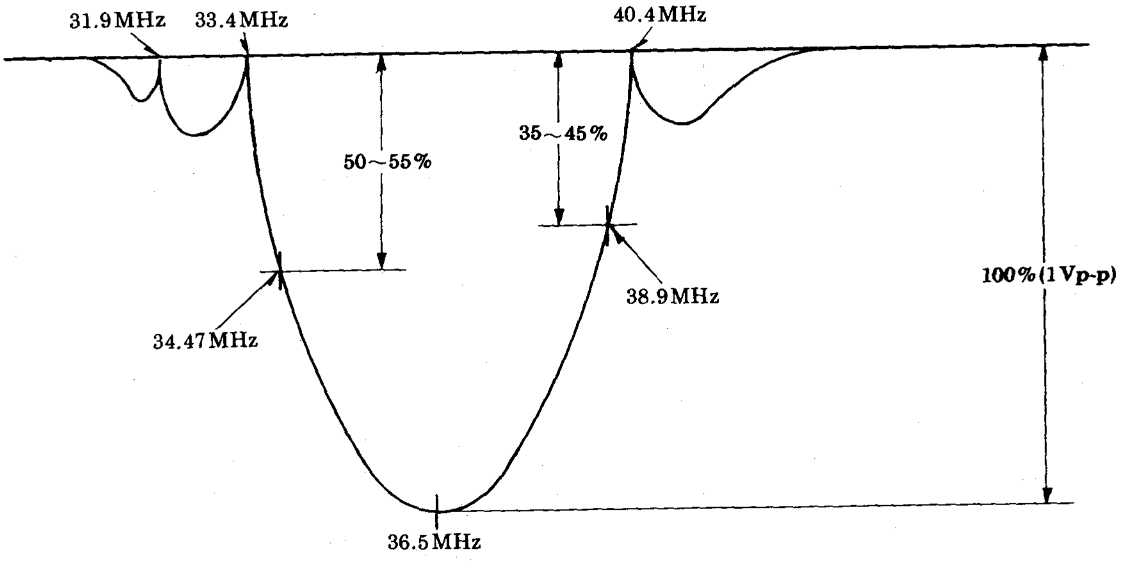


Fig. 3 **Sweep Adjustment of Video IF**

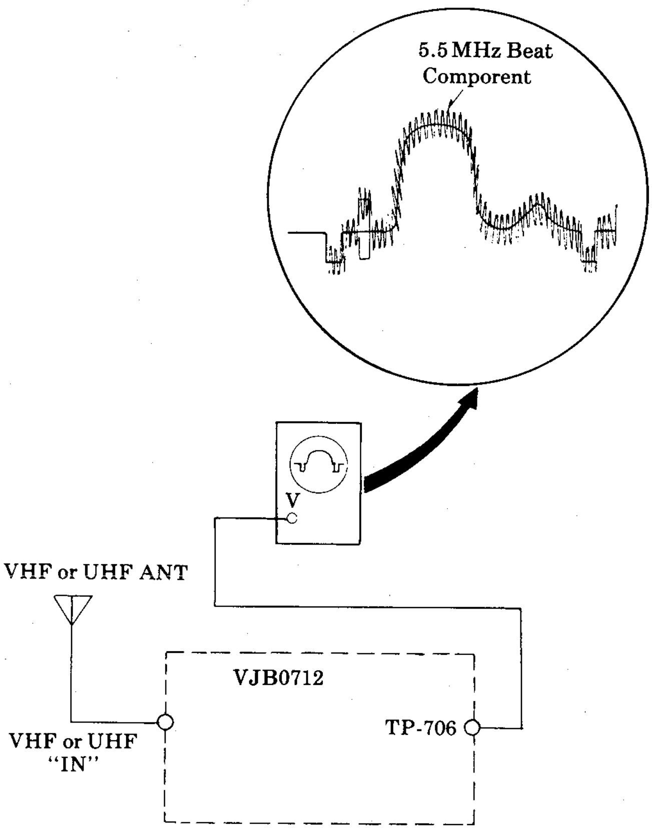
2. 5.5MHz Coil Adjustment

Test Equipment Connections:

Preliminary: Set channel selector to on-air channel.
Oscilloscope: Connect as shown in Fig. 4.

Adjustment Procedure:

1	Push "OFF" AFT switch.
2	Turn "Fine Tuning" knob until 5.5MHz beat as shown in Fig. 4 is observed.
3 Adjustment of T708	Adjust T708 for minimum 5.5MHz beat component on oscilloscope.



5.5MHz Beat Comporent
V
VHF or UHF ANT
VJB0712
VHF or UHF "IN"
TP-706

Fig. 4. 5.5MHz Coil Adjustment

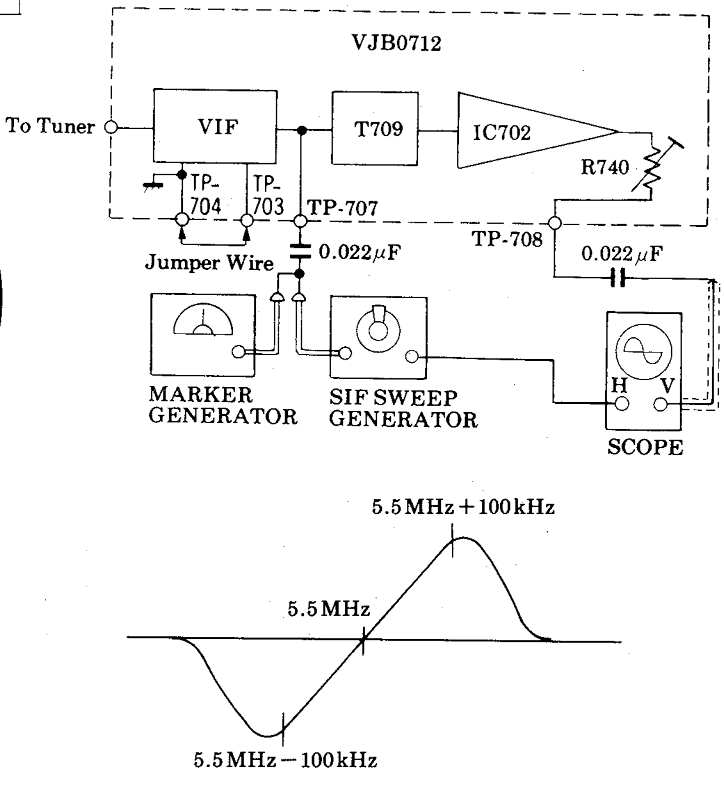
3. Sweep Adjustment os Sound IF & Demodulator

Test Equipment Connections:

Preliminary:	Connect TP-703 and TP-704 (VJB0712) Set R740 to approximately center position.
Oscilloscope:	Connect as shown in Fig. 5.
SIF Sweep Generator:	Connect as shown in Fig. 5.
Marker Generator:	Couple loosely to sweep generator cable to provide marders.

Alignment Procedure:

Adjust T709 for maximum peak-to-peak amplitude of response "A" as shown in Fig. 5.



VJB0712
To Tuner
VIF
T709
IC702
R740
TP-704
TP-703
TP-707
TP-708
Jumper Wire
0.022μF
0.022μF
MARKER GENERATOR
SIF SWEEP GENERATOR
H
V
SCOPE
5.5MHz+100kHz
5.5MHz
5.5MHz−100kHz

RESPONSE "A"

Sweep Adjustment of Sound IF and Demodulator

Fig. 5

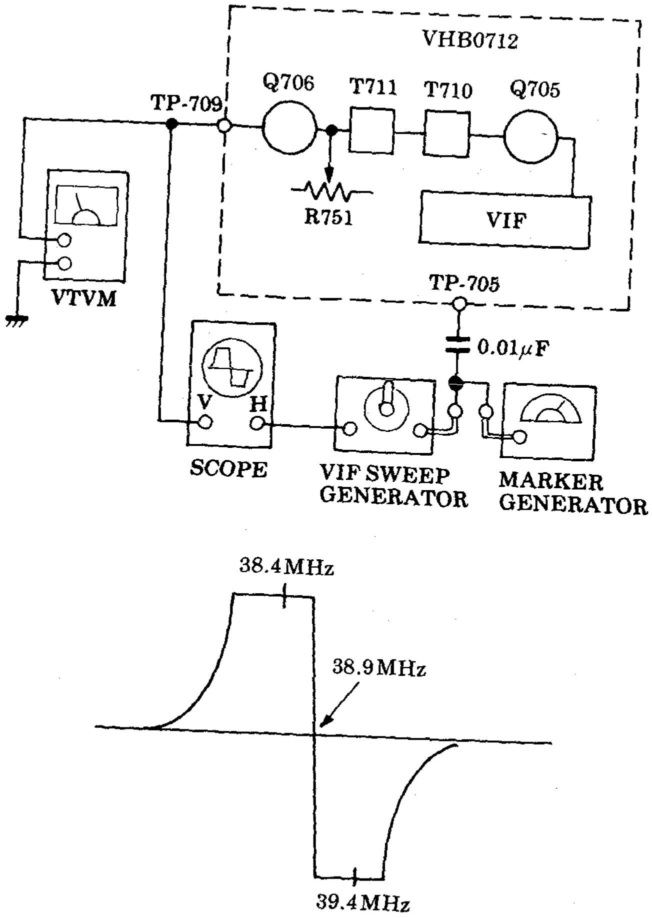
4. AFT (Automatic Fine Tuning) Adjustment

Test Equipment Connections:

Preliminary: Connect TP-703 and TP-704.
Oscilloscope
Sweep Generator Connect as shown in Fig. 6.
VTVM:
Marker Generator: Couple loosely to Sweep Generator cable to provide markers.

Adjustment Procedure:

1		Push "ON" AFT switch.	(Close the pannel for the selection unit.)
2	Adjustment of T711	Adjust T711 for the 38.9MHz marker position of response "A" as shown in Fig. 6.	
3	Adjustment of T710	Adjust T710 for maximum peak to peak amplitude of response "A" as shown in Fig. 6.	
4		Push "OFF" AFT switch.	(Open the pannel for the selection unit.)
5	Adjustment of R751	Adjust R751 for 6.5V at TP-709.	


VHB0712
TP-709
Q706
T711
T710
Q705
R751
VIF
TP-705
0.01μF
VTVM
V
H
SCOPE
VIF SWEEP GENERATOR
MARKER GENERATOR
38.4MHz
38.9MHz
39.4MHz

AFT Adjustment

Fig. 6

ADJUSTMENT OF TUNER AND TV DEMODULATOR MODEL VEQ0176D

GENERAL INFORMATION

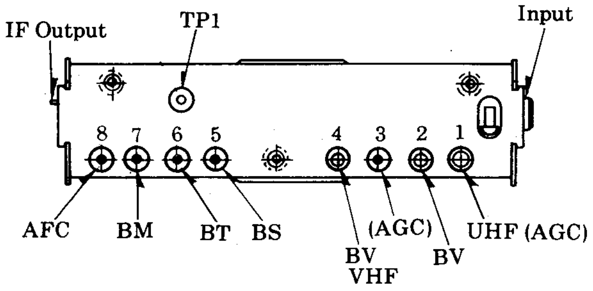
All adjustments on Signal C.B. VJB0712 can be done from their component side.

SIGNAL OVERLOAD

Excessive signal from the sweep generator can cause overloading of the receiver circuits causing incorrect adjustment characteristics. To determine that this condition is not present and that the response is a true representation, turn the sweep generator output to zero.
Gradually increase the output until a response is obtained. Further increase of the sweep output should not change the configuration of the response except in amplitude.
If the response changes in configuration, such as flattening at the top or dropping below the base line at the bottom, decrease the sweep output to restore the proper configuration. The oscilloscope gain should be set as high as possible to maintain usable pattern with the peak-to-peak values specified, thus requiring a lower output from the sweep generator and less change of overload. Insertion of markers from the signal generator should not cause distortion of response. The markers should be kept as small as possible and still remain visible.

TUNER ADJUSTMENT

Both UHF and VHF tuners are factory preset and normally should not require any adjustment procedure.



Tuner Adjustment

Fig. 1

ADJUSTMENT PROCEDURE:

	STEP	ADJUSTMENT	MARKER GEN
1	Bias Voltage Setting	Set Bias voltage so that waveform on Oscilloscope is always 1 Vp-p.	
2	Adjustment of L1	Adjust for maximum gain at 44 MHz. If waveform exceeds 1 Vp-p set bias voltage again. (Bias voltage should be adjusted always for 1 Vp-p).	36.5 MHz
3	Adjustment of T706	Adjust T706 for maximum gain at 36.5 MHz.	36.5 MHz
4	Adjustment of T701	Adjust T701 for maximum gain at 36.5 MHz.	36.5 MHz
5	Adjustment of T703	Adjust T703 for maximum gain at 36.5 MHz.	36.5 MHz
6	Adjustment of T704, T705 and C714	Adjust T704, T705 and C714 for maximum gain at 36.5 MHz.	36.5 MHz
8	Adjustment of R702 and T702	Insulated adjustment tool should be used. Adjust for minimum gain at 40.4 MHz.	40.4 MHz
9	Adjustment of T707	Adjust T707 for minimum gain at 33.4 MHz.	33.4 MHz
10	Adjustment of R718	Insulated adjustment tool should be used. Adjust R718 for minimum gain at 33.4 MHz.	33.4 MHz
11	Readjustment	Repeat step 8 and 9.	
12	Check IF Overall	Check frequency response. (1) Marker heights of 34.47 MHz and 38.9 MHz are each 50—55 % and 35 % — 55 % of total height. (2) Slopes near 34.47 MHz and 38.9 MHz are symmetrical with each other. (See Fig. 3). If response curver is not correct, adjust T704, T705 and C714 slightly.	As indicated in Fig. 3.
13	Readjustment	Repeat step 3 to 9.	
14	Check IF Overall with weak signal	Set bias voltage to about 3 volts, and decrease output level of sweep generator. If great distortion is seen on the waveform, repeat step 3 to 10 and 14. But if the distortion is little, it is allowable.	

1. Sweep Adjustment of Video IF

Test Equipment Connections:

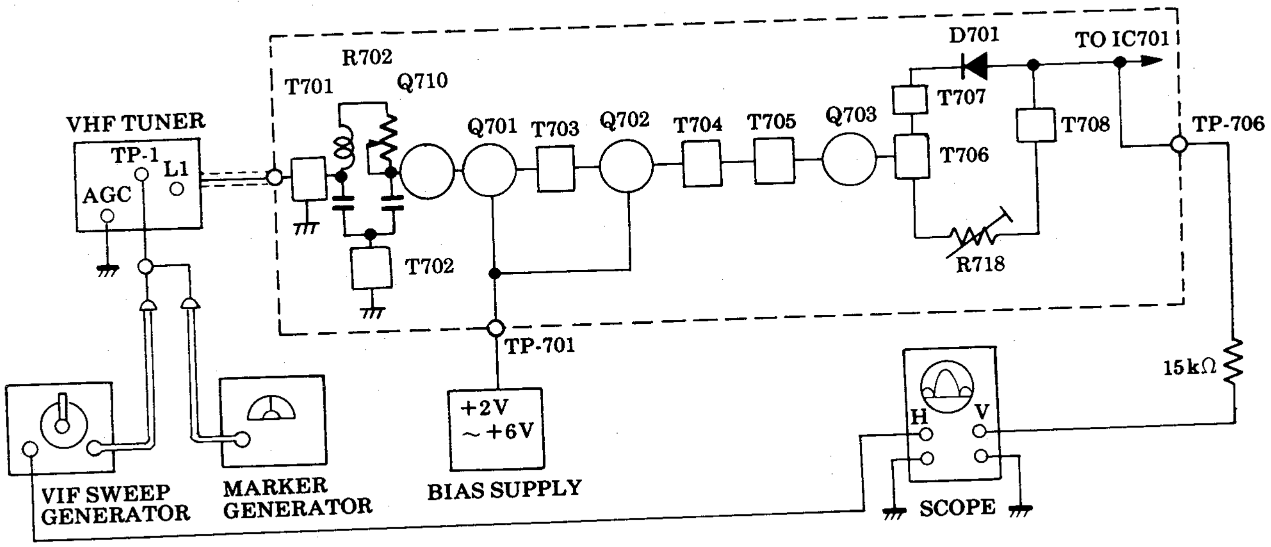
Preliminary: Short circuit AGC Terminal (VHF tuner) to chassis. Set channel selector to off channel (ch. 10 or 12).

Bias Supply: Apply 3—4 volts to TP701 VJB0712

Oscilloscope: Connect as shown in Fig. 2.

VIF Sweep Generator: Frequency from 31 MHz to 41 MHz and Band Width 10 MHz (See Fig. 3).

Marker Generator: Couple loosely to sweep generator cable to provide markers.



VHF TUNER
TP-1
L1
AGC
T701
R702
Q710
Q701
T703
Q702
T704
T705
Q703
D701
TO IC701
T707
T708
T706
R718
T702
TP-706
TP-701
15kΩ
+2V ~+6V
BIAS SUPPLY
VIF SWEEP GENERATOR
MARKER GENERATOR
H
V
SCOPE

Fig. 2 Test Equipment Connections

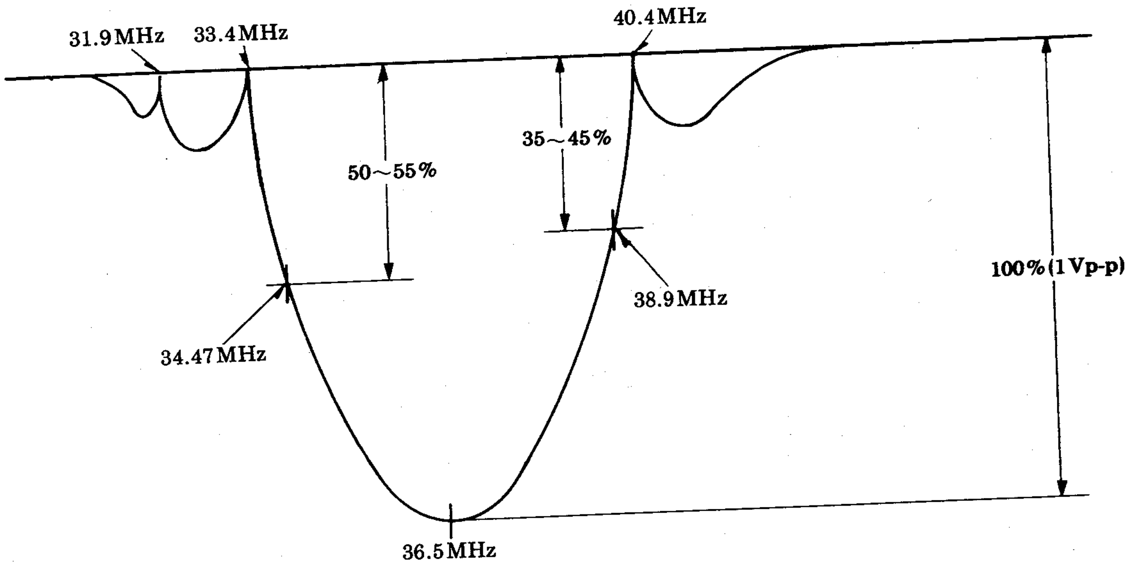


Fig. 3 Sweep Adjustment of Video IF

2. 5.5 MHz Coil Adjustment

Test Equipment Connections:

Preliminary: Set channel selector to on-air channel.
Oscilloscope: Connect as shown in **Fig. 4.**

Adjustment Procedure:

1		Push "OFF" AFT switch.
2		Turn "Fine Tuning" knob until 5.5 MHz beat as shown in Fig. 4 is observed.
3	Adjustment of T708	Adjust T708 for minimum 5.5 MHz beat component on oscilloscope.

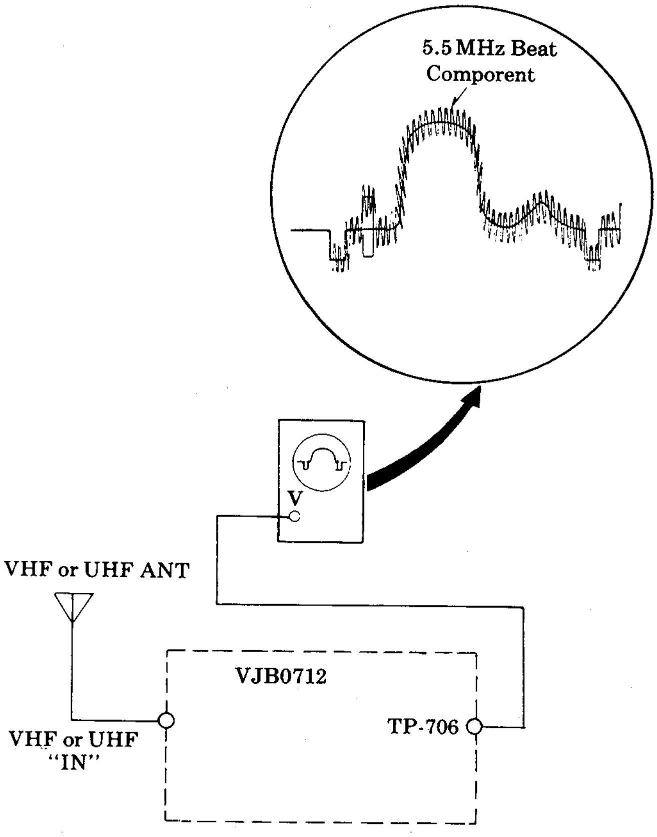

5.5 MHz Beat
Component
V
VHF or UHF ANT
VJB0712
VHF or UHF
"IN"
TP-706

Fig. 4. 5.5 MHz Coil Adjustment

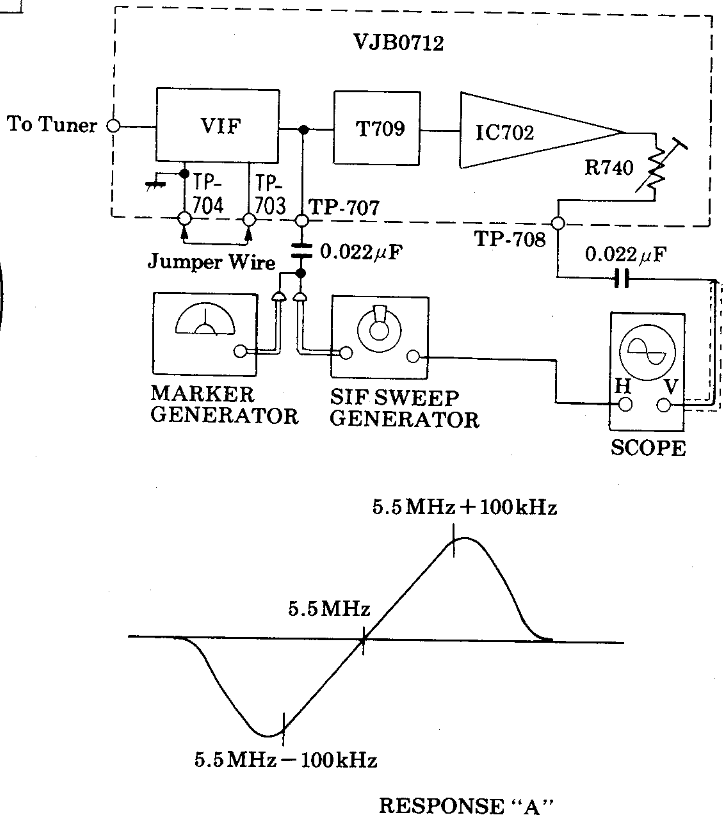
3. Sweep Adjustment os Sound IF & Demodulator

Test Equipment Connections:

Preliminary:	Connect TP-703 and TP-704 (VJB0712) Set R740 to approximately center position.
Oscilloscope:	Connect as shown in **Fig. 5.**
SIF Sweep Generator:	Connect as shown in **Fig. 5.**
Marker Generator:	Couple loosely to sweep generator cable to provide marders.

Alignment Procedure:

Adjust T709 for maximum peak-to-peak amplitude of response "A" as shown in **Fig. 5.**


VJB0712
To Tuner
VIF
T709
IC702
R740
TP-
704
TP-
703
TP-707
TP-708
Jumper Wire
0.022μF
0.022μF
MARKER
GENERATOR
SIF SWEEP
GENERATOR
H
V
SCOPE
5.5 MHz + 100 kHz
5.5 MHz
5.5 MHz − 100 kHz
RESPONSE "A"

Sweep Adjustment of Sound IF and Demodulator

Fig. 5

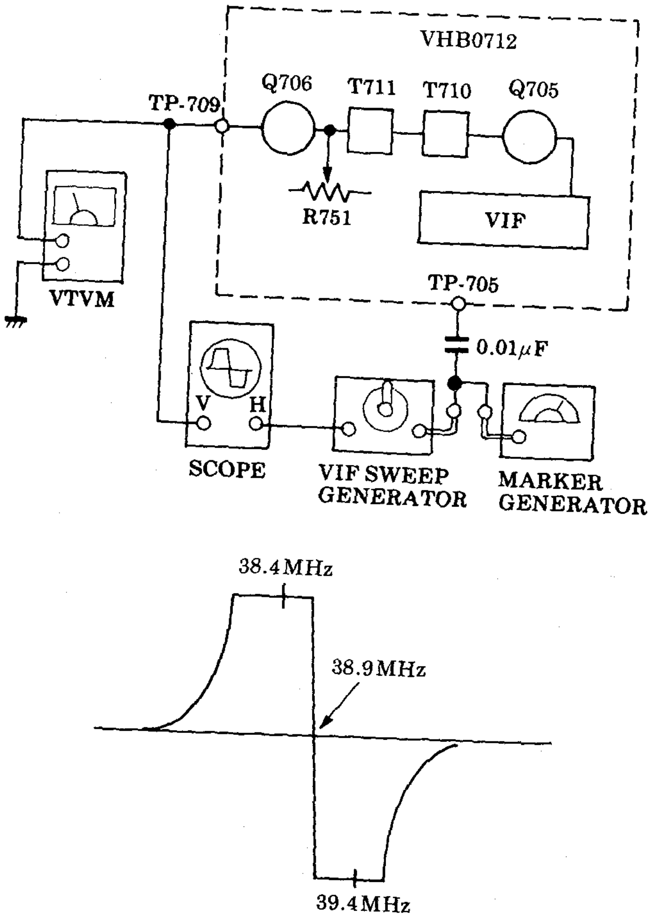
4. AFT (Automatic Fine Tuning) Adjustment

Test Equipment Connections:

Preliminary:	Connect TP-703 and TP-704.
Oscilloscope Sweep Generator VTVM:	Connect as shown in *Fig. 6*.
Marker Generator:	Couple loosely to Sweep Generator cable to provide markers.

Adjustment Procedure:

1		Push "ON" AFT switch.	(Close the pannel for the selection unit.)
2	Adjustment of T711	Adjust T711 for the 38.9MHz marker position of response "A" as shown in *Fig. 6*.	
3	Adjustment of T710	Adjust T710 for maximum peak to peak amplitude of response "A" as shown in *Fig. 6*.	
4		Push "OFF" AFT switch.	(Open the pannel for the selection unit.)
5	Adjustment of R751	Adjust R751 for 6.5V at TP-709.	


VHB0712
TP-709
Q706
T711
T710
Q705
R751
VIF
TP-705
0.01μF
VTVM
V
H
SCOPE
VIF SWEEP GENERATOR
MARKER GENERATOR
38.4MHz
38.9MHz
39.4MHz

AFT Adjustment

Fig. 6

ADJUSTMENT OF TUNER AND TV DEMODULATOR MODEL VEQ0175D

GENERAL INFORMATION

All adjustments on Signal C.B. VJB0712 can be done from their component side.

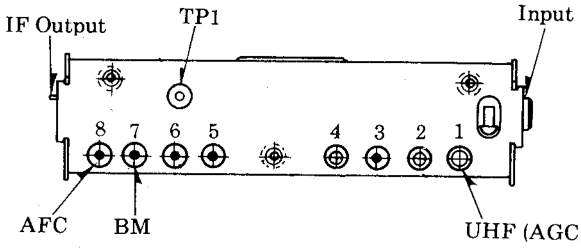
SIGNAL OVERLOAD

Excessive signal from the sweep generator can cause overloading of the receiver circuits causing incorrect adjustment characteristics. To determine that this condition is not present and that the response is a true representation, turn the sweep generator output to zero. Gradually increase the output until a response is obtained. Further increase of the sweep output should not change the configuration of the response except in amplitude.

If the response changes in configuration, such as flattening at the top or dropping below the base line at the bottom, decrease the sweep output to restore the proper configuration. The oscilloscope gain should be set as high as possible to maintain usable pattern with the peak-to-peak values specified, thus requiring a lower output from the sweep generator and less change of overload. Insertion of markers from the signal generator should not cause distortion of response. The markers should be kept as small as possible and still remain visible.

TUNER ADJUSTMENT

UHF tuneris factory preset and normally should not require any adjustment procedure.



Tuner Adjustment

Fig. 1

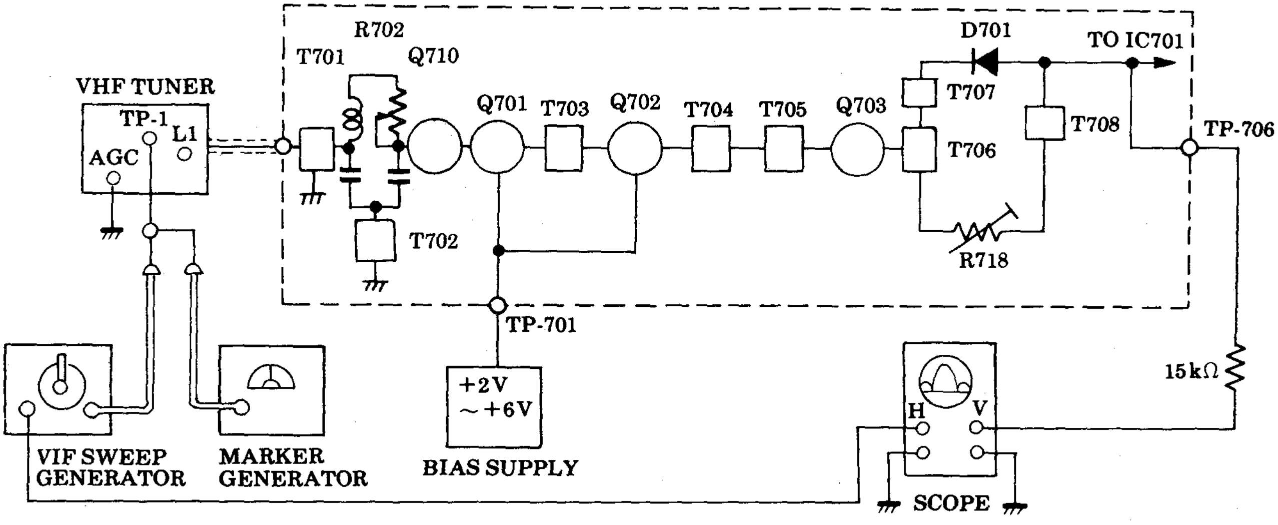
ADJUSTMENT PROCEDURE:

	STEP	ADJUSTMENT	MARKER GEN
1	Bias Voltage Setting	Set Bias voltage so that waveform on Oscilloscope is always 1 Vp-p.	
2	Adjustment of L1	Adjust for maximum gain at 37.0 MHz. If waveform exceeds 1 Vp-p set bias voltage again. (Bias voltage should be adjusted always for 1 Vp-p).	37.0 MHz
3	Adjustment of T706	Adjust T706 for maximum gain at 37.0 MHz.	37.0 MHz
4	Adjustment of T701	Adjust T701 for maximum gain at 37.0 MHz.	37.0 MHz
5	Adjustment of T703	Adjust T703 for maximum gain at 37.0 MHz.	37.0 MHz
6	Adjustment of T704, T705 and C714	Adjust T704, T705 and C714 for maximum gain at 37.0 MHz.	37.0 MHz
8	Adjustment of R702 and T702	Insulated adjustment tool should be used. Adjust for minimum gain at 41.5 MHz.	41.5 MHz
9	Adjustment of T707	Adjust T707 for minimum gain at 33.5 MHz.	33.5 MHz
10	Adjustment of R718	Insulated adjustment tool should be used. Adjust R718 for minimum gain at 33.5 MHz.	33.5 MHz
11	Readjustment	Repeat step 8 and 9.	
12	Check IF Overall	Check frequency response. (1) Marker heights of 35.07 MHz and 39.5 MHz are each 50—55% and 35%—55% of total height. (2) Slopes near 35.0 MHz and 39.5 MHz are symmetrical with each other. (See Fig. 3). If response curver is not correct, adjust T704, T705 and C714 slightly.	As indicated in Fig. 3.
13	Readjustment	Repeat step 3 to 9.	
14	Check IF Overall with weak signal	Set bias voltage to about 3 volts, and decrease output level of sweep generator. If great distortion is seen on the waveform, repeat step 3 to 10 and 14. But if the distortion is little, it is allowable.	

1. Sweep Adjustment of Video IF

Test Equipment Connections:

Preliminary:	Short circuit AGC Terminal (UHF tuner) to chassis. Set channel selector to offchanel (ch, 45)
Bias Supply:	Apply 3—4 volts to TP701 VJB0712.
Oscilloscope:	Connect as shown in Fig. 2.
VIF Sweep Generator:	Frequency from 32MHz to 42MHz and Band Width 10MHz (See Fig. 3).
Marker Generator:	Couple loosely to sweep generator cable to provide markers.



VHF TUNER
TP-1
L1
AGC
R702
T701
Q710
Q701
T703
Q702
T704
T705
Q703
D701
TO IC701
T707
T708
T706
TP-706
T702
R718
TP-701
+2V
~+6V
BIAS SUPPLY
15kΩ
H
V
VIF SWEEP GENERATOR
MARKER GENERATOR
SCOPE

Fig. 2 **Test Equipment Connections**

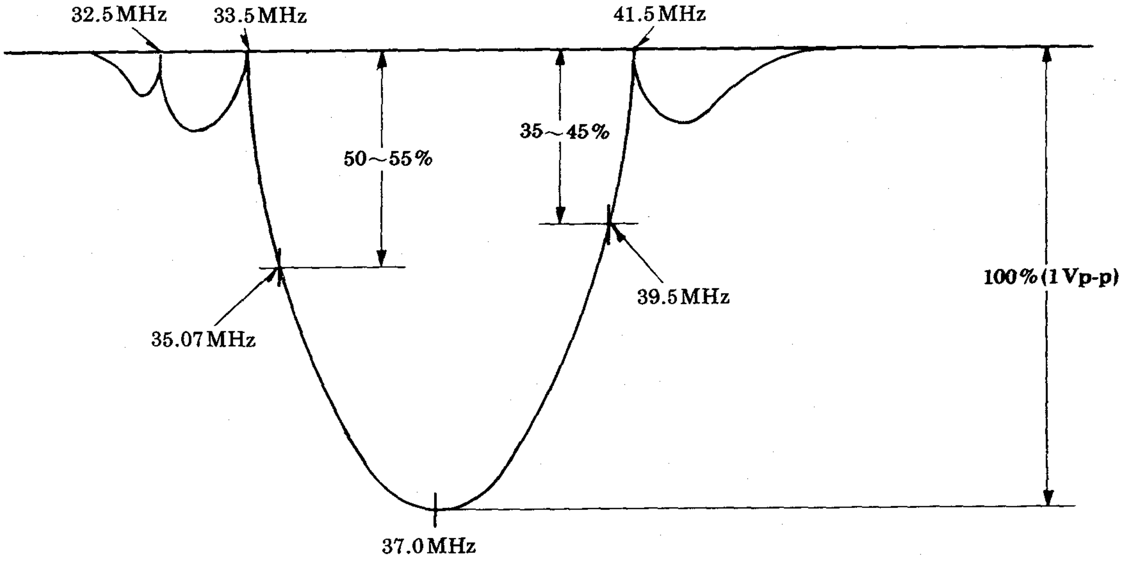


Fig. 3 **Sweep Adjustment of Video IF**

2. 6.0 MHz Coil Adjustment

Test Equipment Connections:

Preliminary: Set channel selector to on-air channel.
Oscilloscope: Connect as shown in **Fig. 4.**

Adjustment Procedure:

1		Push "OFF" AFT switch.
2		Turn "Fine Tuning" knob until 6.0 MHz beat as shown in Fig. 4 is observed.
3	Adjustment of T708	Adjust T708 for minimum 6.0 MHz beat component on oscilloscope.

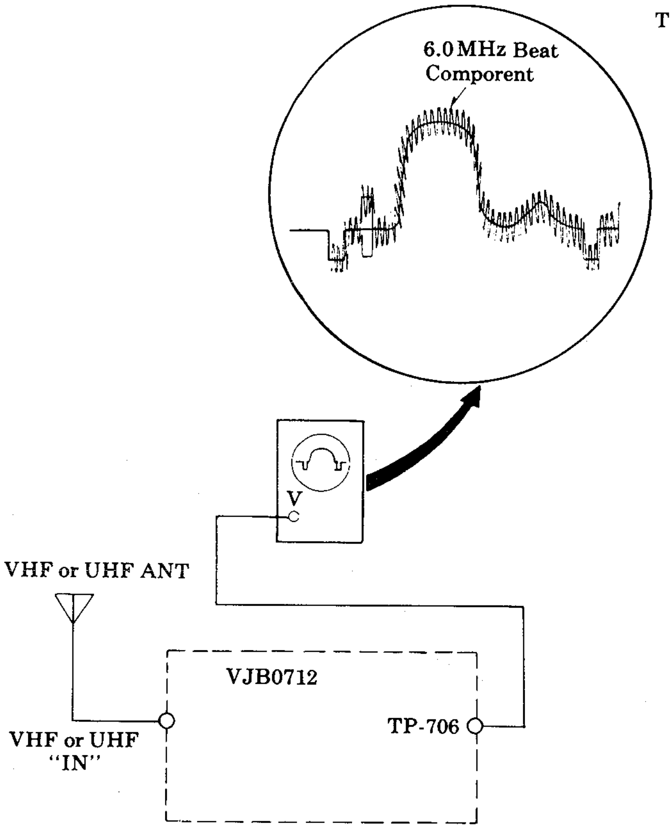

6.0 MHz Beat Component
V
VHF or UHF ANT
VJB0712
VHF or UHF "IN"
TP-706

Fig. 4 6.0 MHz Coil Adjustment

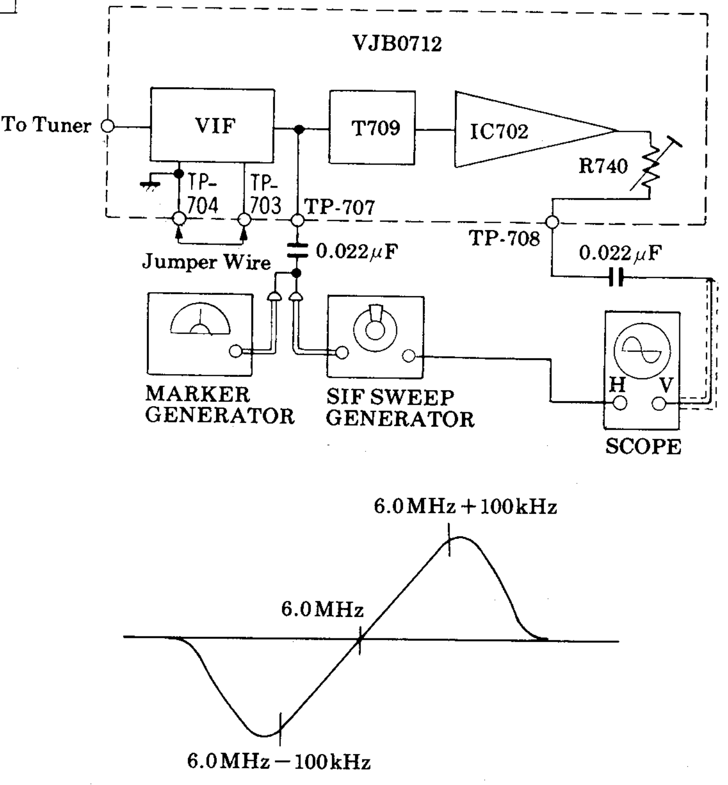
3. Sweep Adjustment of Sound IF & Demodulator

Test Equipment Connections:

Preliminary:	Connect TP-703 and TP-704 (VJB0712) Set R740 to approximately center position.
Oscilloscope:	Connect as shown in **Fig. 5.**
SIF Sweep Generator:	Connect as shown in **Fig. 5.**
Marker Generator:	Couple loosely to sweep generator cable to provide marders.

Alignment Procedure:

Adjust T709 for maximum peak-to-peak amplitude of response "A" as shown in **Fig. 5.**


VJB0712
To Tuner
VIF
T709
IC702
R740
TP-704
TP-703
TP-707
TP-708
0.022μF
0.022μF
Jumper Wire
MARKER GENERATOR
SIF SWEEP GENERATOR
H
V
SCOPE
6.0MHz + 100kHz
6.0MHz
6.0MHz − 100kHz

RESPONSE "A"

Sweep Adjustment of Sound IF and Demodulator

Fig. 5

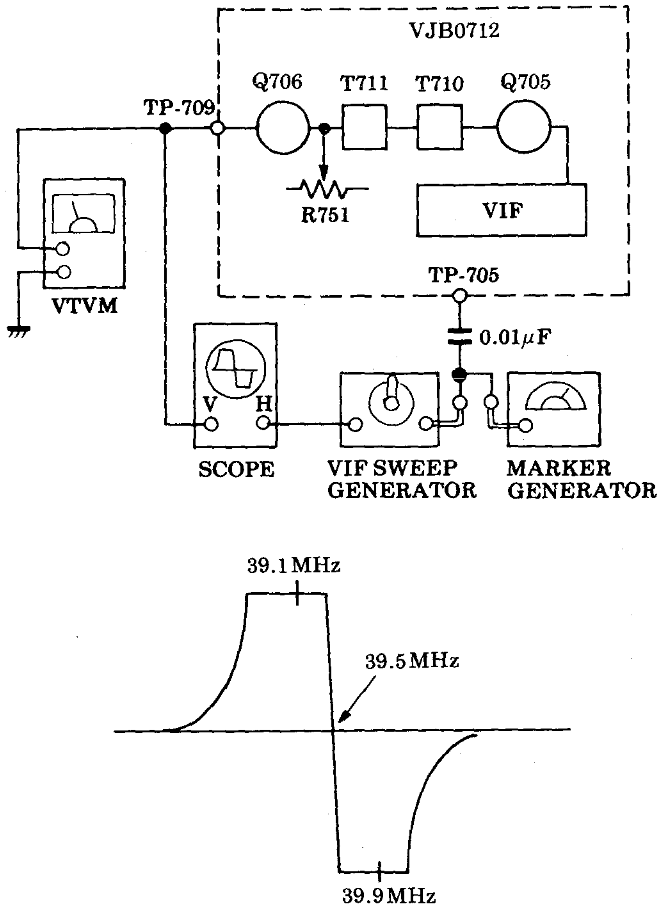
4. AFT (Automatic Fine Tuning) Adjustment

Test Equipment Connections:

Preliminary:	Connect TP-703 and TP-704.
Oscilloscope Sweep Generator VTVM:	Connect as shown in Fig. 6.
Marker Generator:	Couple loosely to Sweep Generator cable to provide markers.

Adjustment Procedure:

1		Push "ON" AFT switch.	(Close the pannel for the selection unit.)
2	Adjustment of T711	Adjust T711 for the 45.75MHz marker position of response "A" as shown in Fig. 6.	
3	Adjustment of T710	Adjust T710 for maximum peak to peak amplitude of response "A" as shown in Fig. 6.	
4		Push "OFF" AFT switch.	(Open the pannel for the selection unit.)
5	Adjustment of R751	Adjust R751 for 6.5V at TP-709.	


VJB0712
Q706
T711
T710
Q705
TP-709
R751
VIF
TP-705
0.01μF
VTVM
V
H
SCOPE
VIF SWEEP GENERATOR
MARKER GENERATOR
39.1MHz
39.5MHz
39.9MHz

AFT Adjustment

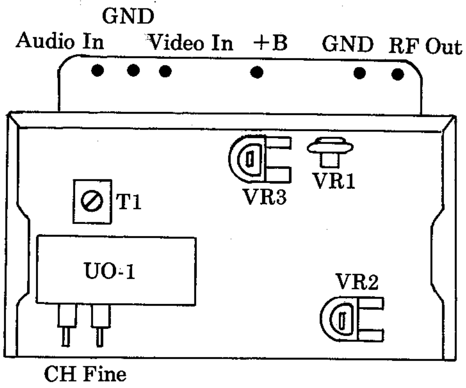
Fig. 6

NV-8610-E/-EO

ADJUSTMENT OF MODEL ENC17319 RF CONVERTER

1. RATING

1-1. Channel: CH36 (591.25 MHz)
1-2. Supply Voltage: 9±0.5V
1-3. RF Output Impedance: 75 Unbal
1-4. Video Input Voltage: 1±0.2Vp-p
1-5. Audio Input Voltage: 0.5±0.1V rms
1-6. Sub-carrier Freq: 5500kHz


GND
Audio In
Video In
+B
GND
RF Out
T1
VR3
VR1
UO-1
VR2
CH Fine

2. ADJUSTMENT

2-1. Adjust the trimmer capacitor (TC1) for fine tuning in order to get 591.25±0.05MHz oscillator frequency.

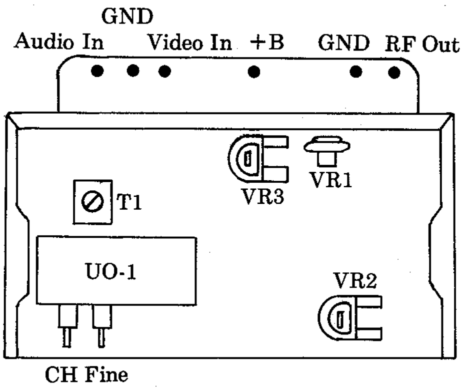
2-2. Adjust the variable resistor (VRI) for video modulation adjustment in order to get 70±5% modulation ratio using standard color bar pattern.

NV-8610-B

ADJUSTMENT OF MODEL ENC17318 RF CONVERTER

1. RATING

1-1. Channel: CH36 (591.25MHz)
1-2. Supply Voltage: 9±0.5V
1-3. RF Output Impedance: 75 Unbal
1-4. Video Input Voltage: 1±0.2Vp-p
1-5. Audio Input Voltage: 0.5±0.1V rms
1-6. Sub-carrier Freq: 6000kHz


GND
Audio In
Video In
+B
GND
RF Out
T1
VR3
VR1
UO-1
VR2
CH Fine

2. ADJUSTMENT

2-1. Adjust the trimmer capacitor (TC1) for fine tuning in order to get 591.25±0.05MHz oscillator frequency.

2-2. Adjust the variable resistor (VRI) for video modulation adjustment in order to get 70±5% modulation ratio using standard color bar pattern.

MECHANICAL ADJUSTMENT PROCEDURES

Disassembly Method

. DISASSEMBLY FLOW CHART

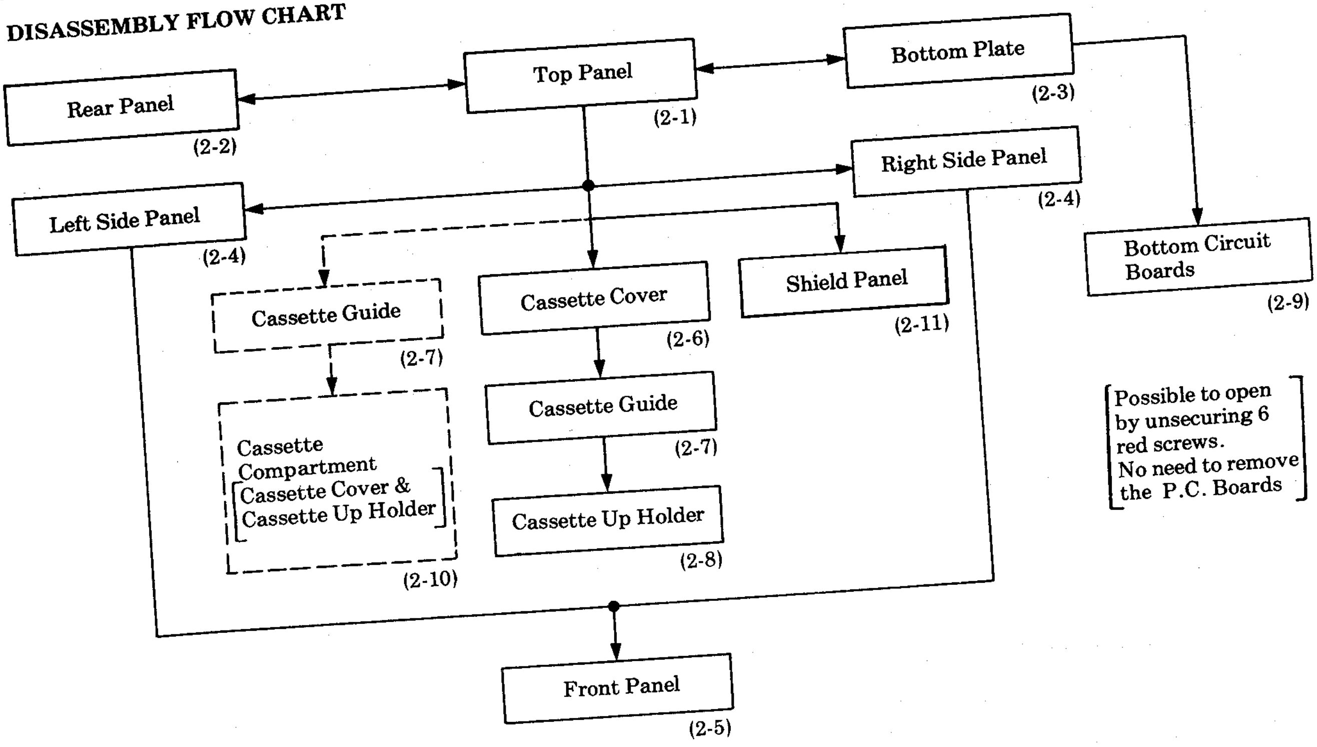

Top Panel
(2-1)
Rear Panel
(2-2)
Bottom Plate
(2-3)
Right Side Panel
(2-4)
Left Side Panel
(2-4)
Bottom Circuit Boards
(2-9)
Cassette Guide
(2-7)
Cassette Cover
(2-6)
Shield Panel
(2-11)
Cassette Guide
(2-7)
Cassette Compartment
Cassette Cover &
Cassette Up Holder
(2-10)
Cassette Up Holder
(2-8)
Possible to open by unsecuring 6 red screws. No need to remove the P.C. Boards
Front Panel
(2-5)

Fig. 1

2. DETAILED DISASSEMBLY METHOD

2-1. Removal of the Top Panel

1. Pull off the Tracking Control Knob.
2. Unscrew the 5 screws (A) and remove the Top Panel.

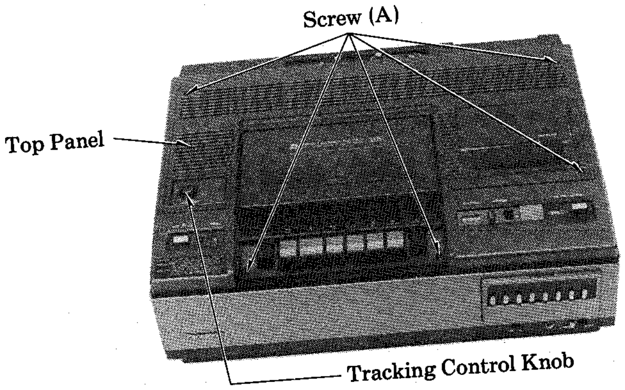

Screw (A)
Top Panel
Tracking Control Knob

Fig. 2

2-2. Removal of the Rear Panel

Unscrew the 5 screws (B) and remove the Rear Panel.

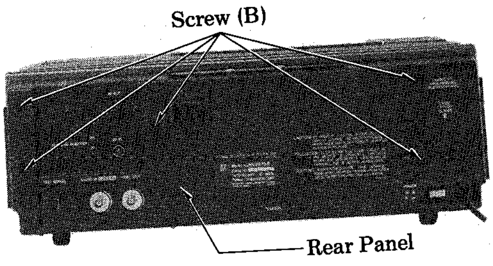

Screw (B)
Rear Panel

Fig. 3

2-3. Removal of the Bottom Plate

Unscrew the 6 screws (C) and remove the Bottom Plate.

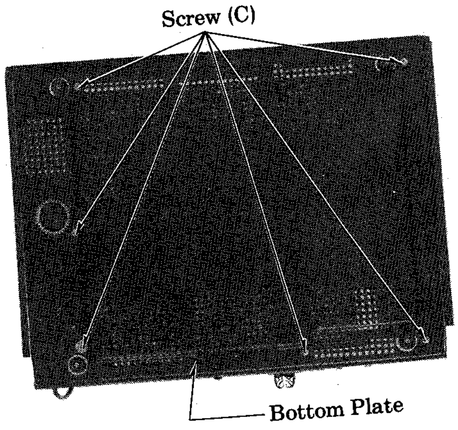

Screw (C)
Bottom Plate

Fig. 4

2-4. Removal of the Side Panels

Unscrew the 4 screws (D) on both sides and remove the Side Panels.

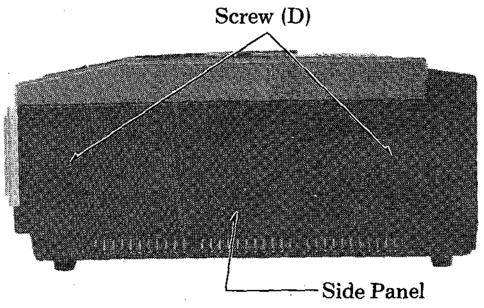

Screw (D)
Side Panel

Fig. 5

2-5. Removal of the Front Panel

1. Unscrew the 4 screws (E), loosen the 2 screws (F) and remove the Front Panel.
2. And disconnect the connector P705 on the Demodulator Circuit Board.

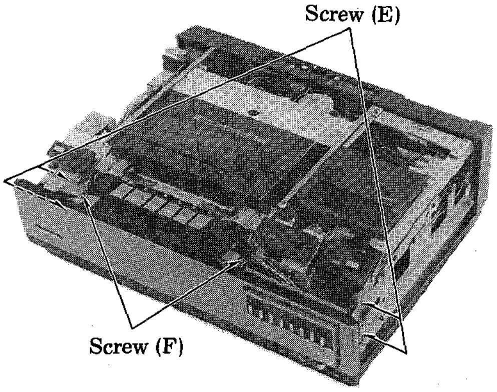

Screw (E)
Screw (F)

Fig. 6

2-6. Removal of the Cassette Cover

1. Press the Eject Button to raise the Cassette Compartment.
2. Unscrew the 4 screws (G) and remove the Cassette Cover.

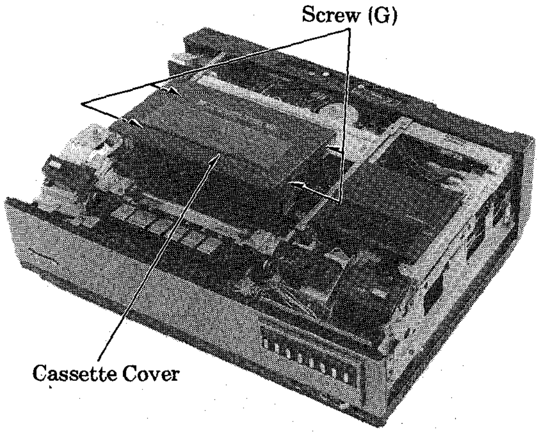

Screw (G)
Cassette Cover

Fig. 7

2-7. Removal of the Cassette Guide

Unscrew the 2 screws (H) and remove the Cassette Guide.

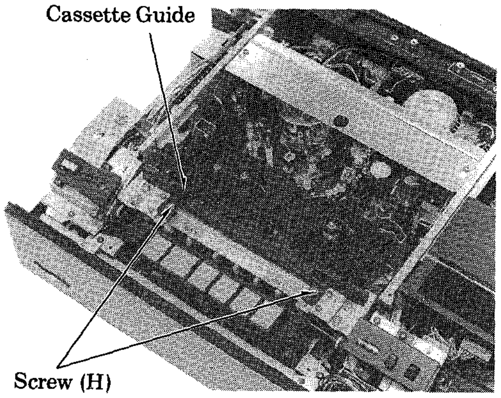

Cassette Guide
Screw (H)

Fig. 8

2-8. Removal of the Cassette Up Holder

Unscrew the 4 screws (I) and remove the Cassette Up Holder.

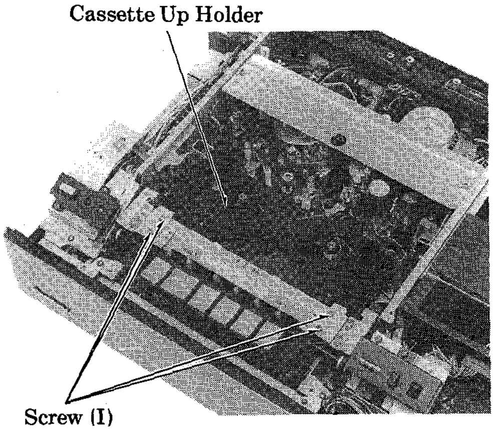

Cassette Up Holder
Screw (I)

Fig. 9

2-9. Opening the Bottom Circuit Boards

Unscrew the 6 screws (J) securing the circuit boards to the frames for replacements or adjustments of the parts which are located under the chassis.

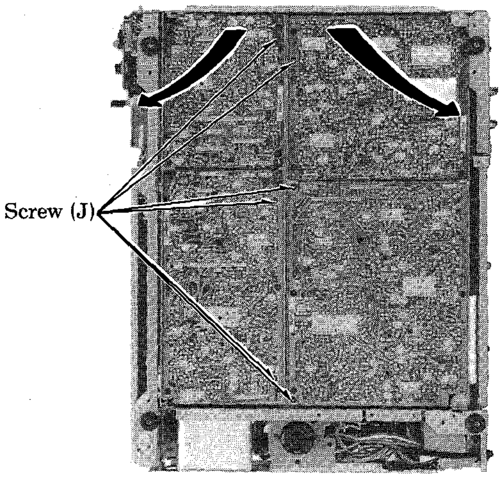


Fig. 10

2-10. Removal of the Cassette Compartment

1. Press the Eject Button to raise the Cassette Compartment.
2. Unscrew the 4 screws (K) and remove the Cassette Compartment.

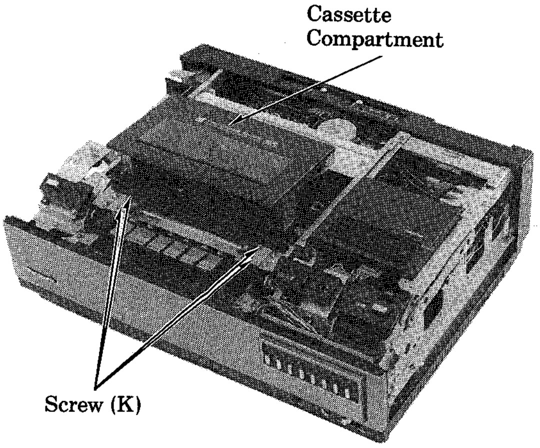

Cassette Compartment
Screw (K)

Fig. 11

2-11. Removal of the Shield Panel

Loosen the 2 screws (L) and remove the shield panel.

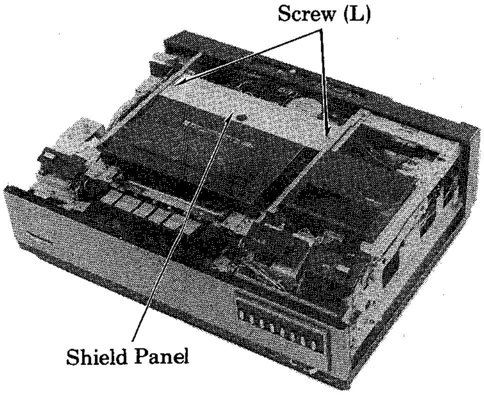

Screw (L)
Shield Panel

Fig. 12

Mechanical Maintenance Procedures

1. REPLACEMENT OF THE VIDEO HEAD DISC

1. Remove the Top Panel and the Shield Panel. (Refer to section "DISASSEMBLY METHOD", Item 2-1 and 2-11).
2. Press the Eject button to raise the Cassette Compartment, preventing the video heads from being damaged.
3. Unscrew the screw (A) and remove the brush unit.
4. Unscrew the 2 screws (B) and remove the wire guide.
5. Unsolder the 4 lead wires of the video heads from the head relay board and remove the Video Head Disc (Upper Cylinder).

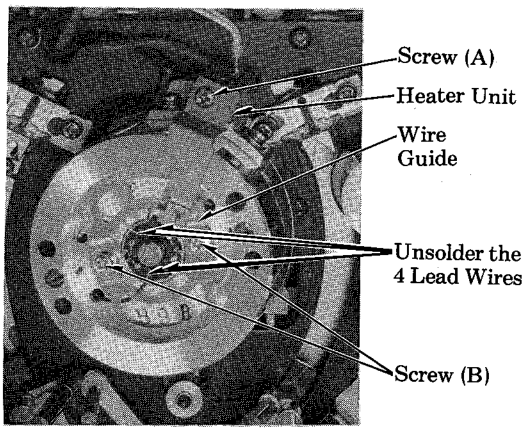

Screw (A)
Heater Unit
Wire Guide
Unsolder the 4 Lead Wires
Screw (B)

Fig. 13

6. Clean the flange, bottom and rotative surface of the new Video Head Disc with a soft cloth dampened with alcohol or freon liquid.
7. Place the new Video Head Disc on the head disc base so that the screw holes match.
8. Solder the 4 lead wires to the head relay board, be sure to match the wire colors and tighten the 2 screws (B) with the wire guide.
9. Place the brush unit with a screw (A).

2. REPLACEMENT AND ADJUSTMENT OF DD CYLINDER UNIT

A. Replacement Procedure

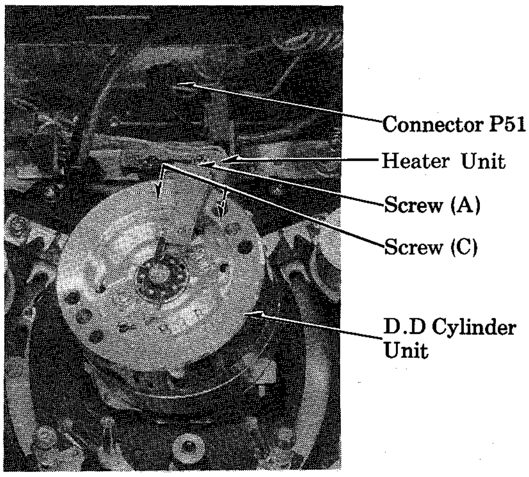

Connector P51
Heater Unit
Screw (A)
Screw (C)
D.D Cylinder Unit

Fig. 14

1. Remove the Top Panel, the Shield Panel, the Rear Panel, the Bottom Plate and the Cassette Cover. (Refer to section "DISASSEMBLY METHOD" Items 2-1, 2-2, 2-3, 2-6 and 2-11).
2. Disconnect the connector P51 on the Head Amp. C.B.A. (VEP0536B and remove the 2 wire clampers.
3. Place the unit vertically so that the left side board is facing down.
4. Unscrew the 6 screws and open the bottom side circuit boards. (Refer to section "DISASSEMBLY METHOD" Item 2-9).
5. Remove the wires connected to P24 on the Servo Control C.B.A (VEP0289G) from the DD Cylinder, from the wire clampers.

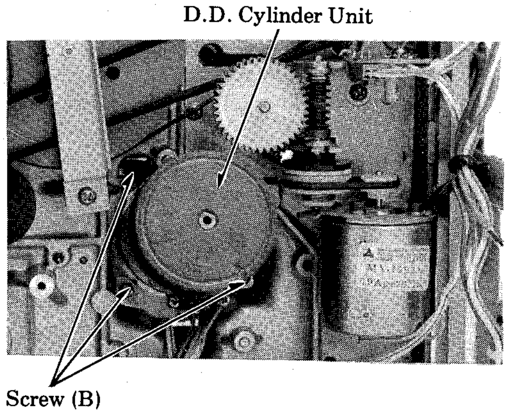


Fig. 15

6. Unscrew the 3 screws (B) securing the DD Cylinder Unit and remove it from the chassis.
7. Unscrew the screw (A) and the screw (C), then remove the Heater Unit.
8. Clean the surface of the new DD Cylinder Unit with a soft cloth dampened with alcohol or freon liquid.
9. Reverse the above steps to complete the installation.

B. Adjustment Procedure

When the DD Cylinder Unit is replaced, the tape interchangeability should be checked. (Refer to section "TAPE INTERCHANGEABILITY ADJUSTMENT" Item 28).

3. REPLACEMENT AND ADJUSTMENT OF THE AUDIO/CONTROL HEAD BASE UNIT

A. Replacement Procedure

1. Remove the Top Panel and the Shield Panel. (Refer to section "DISASSEMBLY METHOD", Item 2-1 and 2-11).
2. Unscrew the 2 screws (A), remove the A/C Head Unit.
3. Unscrew the screw (B) and remove the relay board (VJB 00315).
4. Unsolder the 6 lead wires.
5. Install a new A/C Head Base Unit and reverse the above steps to complete the installation.

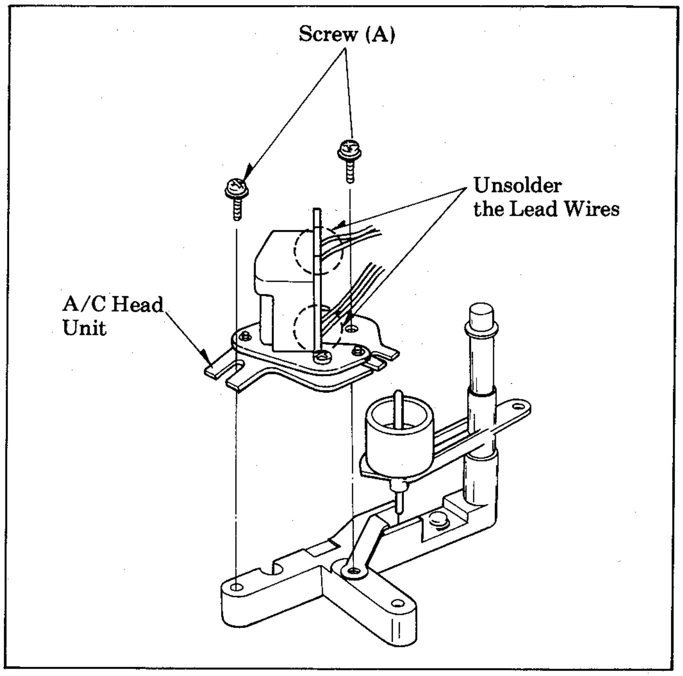


Fig. 16

B. Adjustment Procedure

The height and tilt adjustment procedures of the A/C Head are described in "TAPE INTERCHANGEABILITY ADJUSTMENT", Item 28.

Note: When installing, be care not to contact the wires connected from the relay board VJB00315 to the sensor lamp, with the pressure roller.

4. REPLACEMENT OF THE CAPSTAN MOTOR

A. Replacement Procedure

1. Remove the Top Panel, the Shield Panel, Bottom Plate and open the Bottom P.C. Boards. (Refer to section "DISASSEMBLY METHOD", Items 2-1, 2-3, 2-9 and 2-11).
2. Remove the Capstan Belt and Reel Belt from the Capstan Motor Pulley.

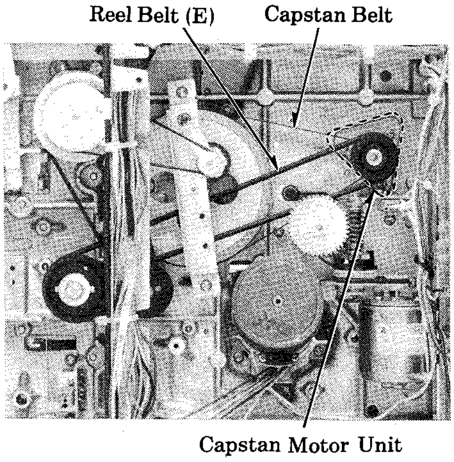


Fig. 17

3. Remove the Inertia Roller Spring (C) and connector P605 on the VJB00171.
4. Unscrew the 3 screws (A) and remove the Capstan Motor Unit from chassis.

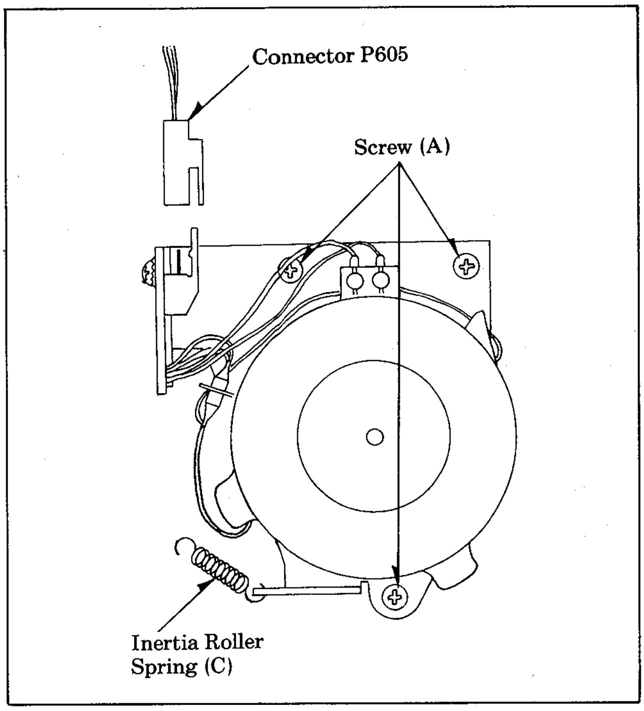


Fig. 18

5. Install the new Capstan Motor and reverse the above steps to complete the installation.

5. MEASUREMENT OF TAPE SPEED AND REPLACEMENT OF CAPSTAN BELT

A. Measurement Procedure

- * *Equipment Required:*
  Frequency Counter
  VHS Alignment Tape VFM8100H3D
- * *Specification:* 600 ± 1.5 Hz

1. Remove the Top Panel and the Shield Panel. (Refer to section "DISASSEMBLY METHOD", Item 2-1 and 2-11).
2. Connect the frequency counter of FG head terminal of the Capstan Motor.
3. Playback the alignment tape and wait until the tape running has well stabilized.

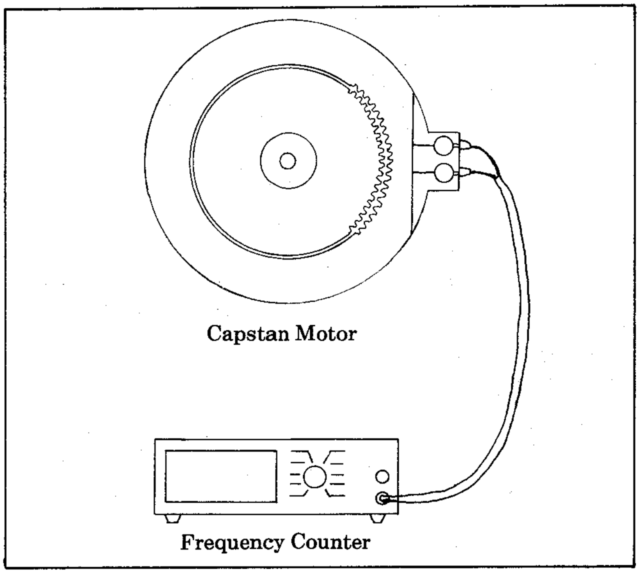


Fig. 19

4. Take the read of the frequency counter and make sure that it is 600 ± 1.5 Hz.
5. When the tape speed is out of the specification, replace the capstan belt.

B. Replacement Procedure

1. Remove the Bottom Plate and unscrew 6 red screws securing P.C.Boards and open the P.C.Boards. (Refer to section "DISASSEMBLY METHOD", Items 2-3 and 2-9)
2. Remove the thrust holder unit and remove the reel belt.
3. Then, change the capstan belt to obtain the correct speed. (VDV0094A, VDV0094B, VDV0094C).

Note: Instal the capstan belt so that the marked side comes outside.

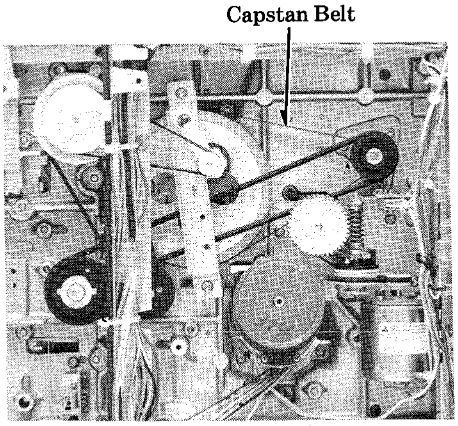


Fig. 20

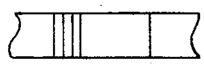
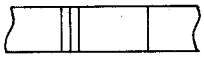
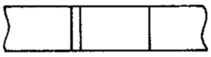
Part No.	Marking	Speed Range
VDV0094A		Slow ↑
VDV0094B		Center
VDV0094C		↓ Fast

Fig. 21

6. REPLACEMENT AND FITTING ADJUSTMENT OF CASSETTE UP HOLDER

A. Replacement Procedures

Refer to section "DISASSEMBLY METHOD", Items 2-2, 2-6, 2-7 and 2-8.

B. Adjustment Procedure

- * *Equipment Required*
  Cassette Holder Jig (VFK0142)

1. Install the Cassette Up Holder.
2. Set the 4 screws (A) and screw them a few turns only.

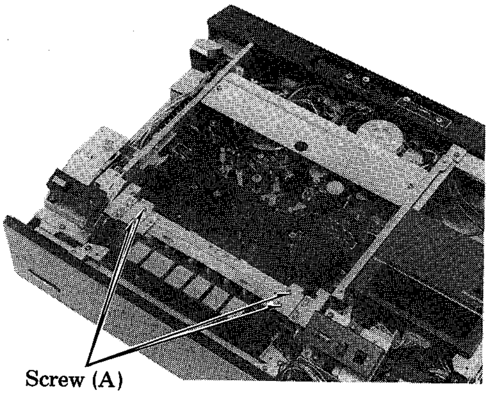


Fig. 22

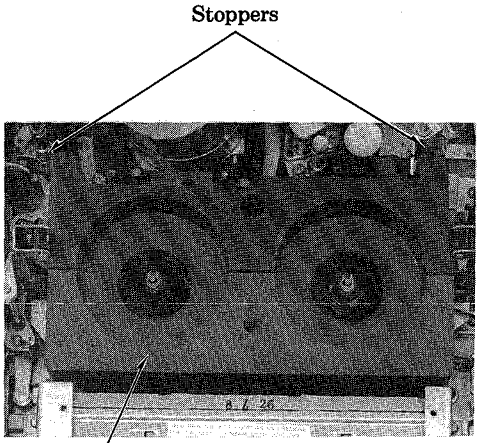


Fig. 23

3. Insert the cassette holder jig untill it touches the stoppers of Cassette Up Holder.
4. While pressing the jig down until Cassette Up Holder latches, adjust the position so that it has smooth movement and correct position.
5. Tighten the 4 screws (A).
6. Press the Eject Button and make sure that it's smooth ejection.
7. Press the Cassette Up Holder down,and make sure that it's normal motion.
8. Repeat above items 6 and 7 to re-confirm.

7. MEASUREMENT AND ADJUSTMENT OF THE BACK TENSION

- *Specification:* 25—30g
- *Equipment Required:*
  Back tension Meter (Tentelometer Made in the U.S.A.)
  VHS Cassette Tape

A. Measurement Procedure

1. Remove the Top Panel and the Shield Panel. (Refer to section "DISASSEMBLY METHOD", Item 2-1 and 2-11.
2. Pull the Supply Inertia Roller in the direction indicated by arrow and hold it with adhesive tape.
3. Playback the cassette tape and wait until the tape running has stabilized (5—10 seconds).
4. Set a tension meter in front of the Supply Inertia Roller and take the read of the meter.

Note: When measuring, make sure that the three posts of the meter are all in good contact with the tape, but out of contact with Supply Inertia Roller.

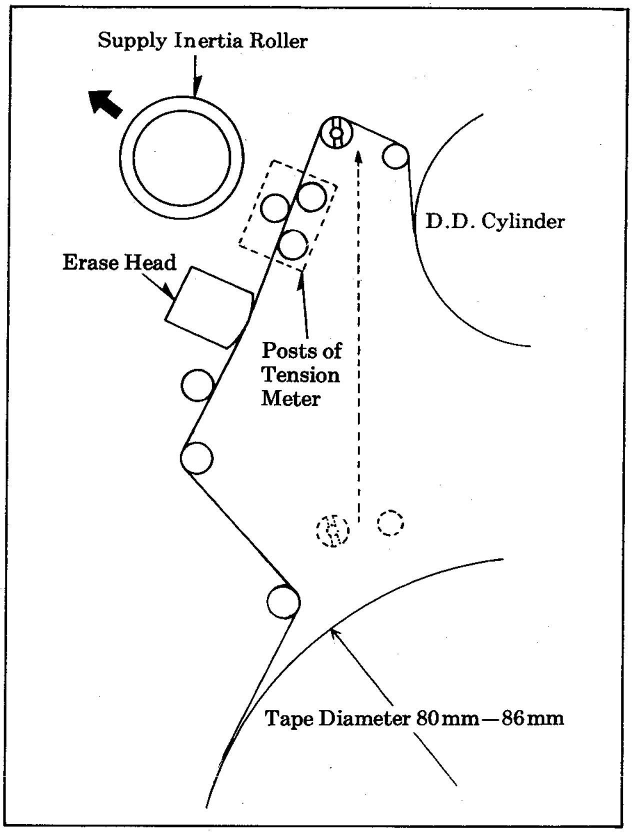


Fig. 24

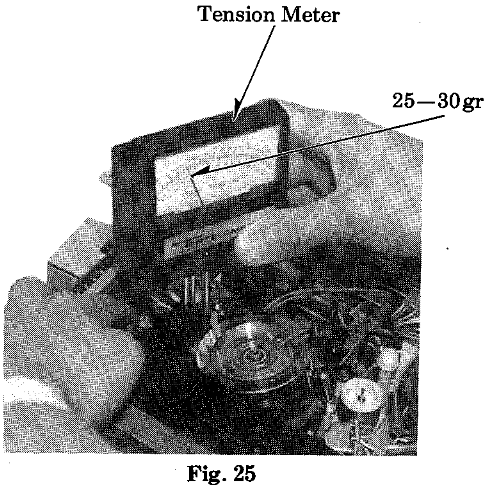


Fig. 25

B. Adjustment Procedure

- *Equipment Required*
  Fine Adjustment Screwdriver (VFK0136)

1. Loosen the screw (A) and set the fine adjustment screwdriver into the hole (B).
2. Move the Threading Spring Hook in either of direction indicated by arrow.
3. Upon completion of adjustment, tighten the screw (A) and remove the adhesive tape for holding inertia roller.

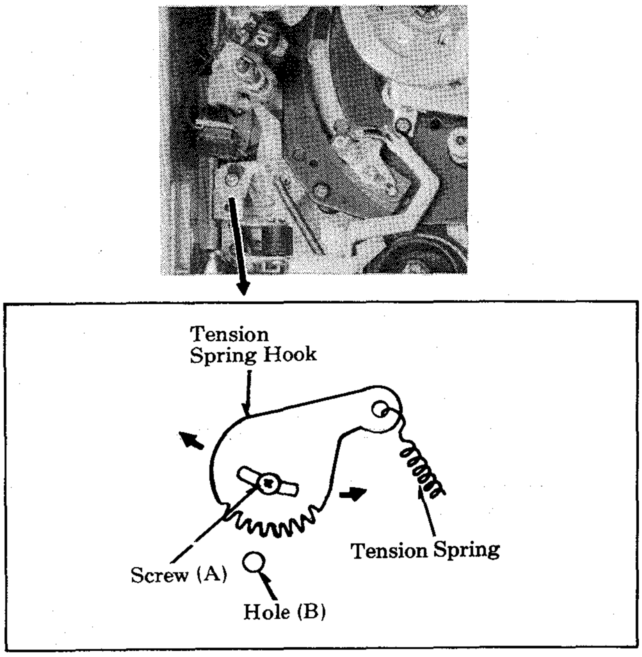

Tension
Spring Hook
Screw (A)
Hole (B)
Tension Spring

Fig. 26

8. ADJUSTMENT OF EJECT LINK CLEARANCE

- *Specification:* 0.5—1.0mm
- *Equipment Required:*
  Cassette Lock Arm Adjusting Jig (VFK0140)

A. Adjustment Procedure

1. Remove the Top Panel, Cassette Guide and Cassette Compartment. (Refer to section "DISASSEMBLY METHOD", Items 2-1, 2-7 and 2-10).
2. Place the cassette lock arm adjusting jig, loosen the screw (A) and displace the Lever to have the clearance controlled within 0.5—1.0mm.
3. Upon completion of adjustment, tighten the screw (A).
   (The diameter of the wire of an ordinary paper clip is about 0.9mm).

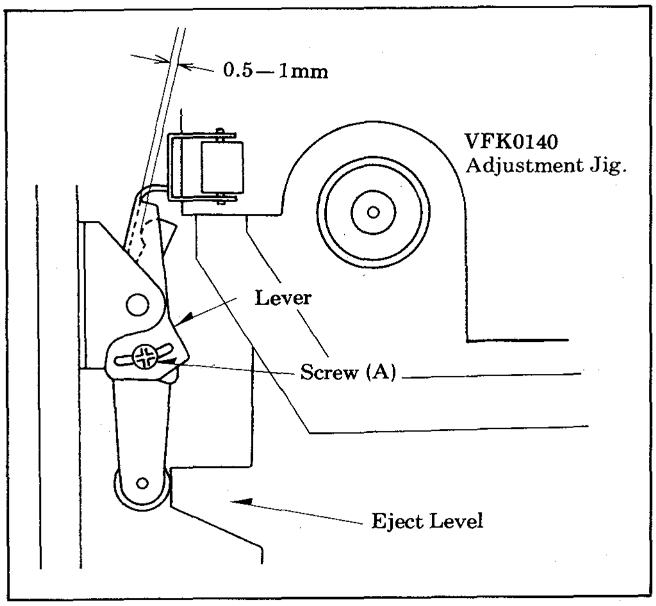

0.5—1mm
VFK0140
Adjustment Jig.
Lever
Screw (A)
Eject Level

Fig. 27

Notes:

1. When adjusting, make sure that the Eject Lever is reset perfectly.
2. Upon completion of the adjustment, "FITTING ADJUSTMENT OF CASSETTE UP HOLDER" also should be checked.

9. MEASUREMENT/ADJUSTMENT/CONFIRMATION OF BRAKING FORCE AND REPLACEMENT OF BRAKE UNITS.

- *Specification:* (Take up reel table side)
- *Braking Force:* A...(450—650g-cm)
  B...(65—135g-cm)

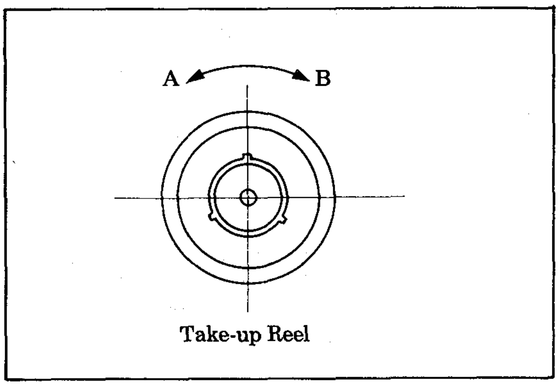

A
B
Take-up Reel

Fig. 28

A. Measurement Procedure

- *Equipment Required:*
  Dial Torque Gauge (VFK0133)
  Adaptor (VFK0134)

1. Remove the Top Panel and Cassette Cover. (Refer to section "DISASSEMBLY METHOD", Items 2-1 and 2-6).
2. Attach the adaptor to the torque gauge.
3. Set the torque gauge to the Reel Table in STOP mode.
4. Rotate the gauge slowly in the each directions and take the reading at the moment when the Reel Table begins slipping.

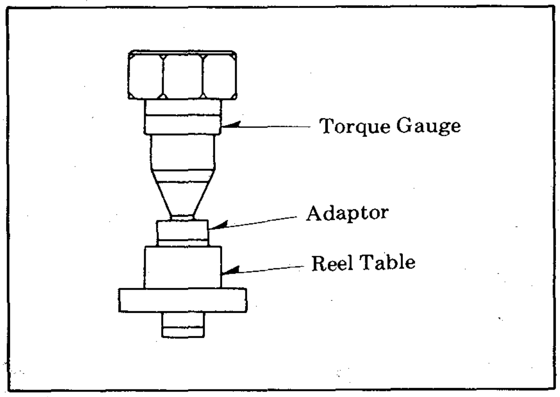

Torque Gauge
Adaptor
Reel Table

Fig. 29

B. Adjustment Procedure

1. For adjustment of braking force A, change the spring position, selecting the proper notch.
2. The braking forces B is only to be measured for confirmation.

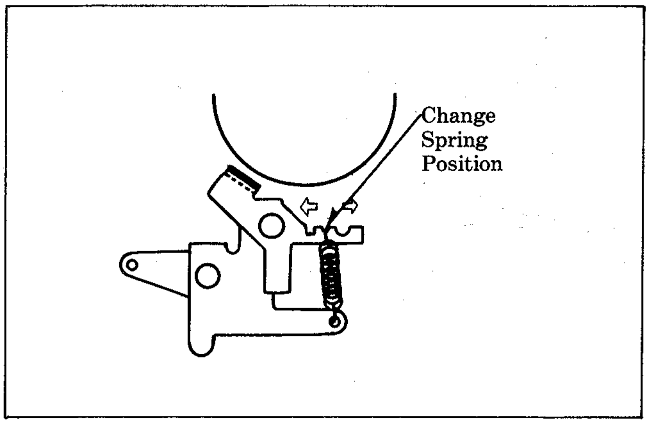


Fig. 30

* *Specification:* (Supply reel table side)
* *Braking Force:* A...(150—180g-cm)
B...(75—115g-cm)

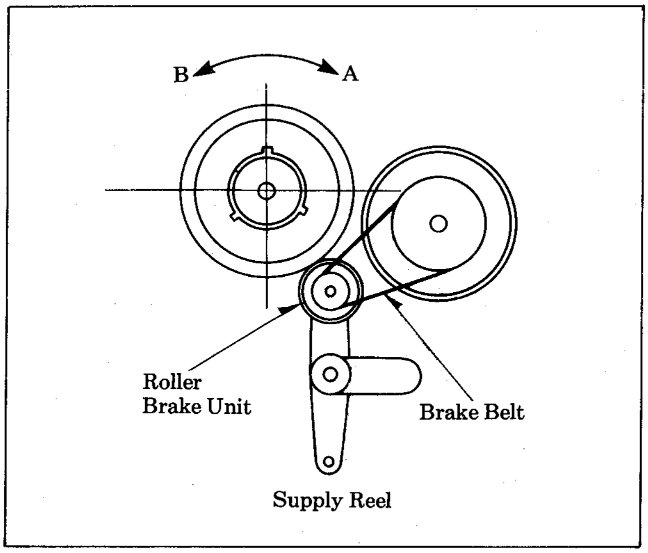


Fig. 31

A. Measurement Procedure

Refer to section "MEASUREMENT Procedure (Take up reel table side)", Item 9-A.

B. Confirmation of the Braking Force

1. Confirm that the Braking force A and B are in specification.
2. When the Braking force is out of the specification, replace the Brake Belt or the Roller Brake Unit.

C. Replacement Procedure

* *Equipment Required:*
Retaining Ring Remover—4mm (VFK0145)
After adjustment, it is still out of specification, then replace the Brake Unit.

When replacing Brake Belt, follow the sters 1 to 5 and 8.
When replacing Brake Unit, follow the steps 1 to 4 and 6 to 8.

1. Remove the Top Panel, Cassette Guide and Cassette Compartment. (Refer to section "DISASSEMBLY METHOD" Items 2-1, 2-7 and 2-10).
2. Remove the Counter Belt A.
3. Unscrew the screw (A), remove the Shaft Guide Angle, and the Eject Link Unit.
4. Unscrew the 2 screws (B) and lift the Connecting Lever with Cassette Arm A Unit, so that the Connecting Lever stands vertically.
5. Remove the Brake Belt.
6. Remove the Brake Arm Springs or the Brake Lever Spring or both of them.
7. Remove the Retaining Ring (S) and Brake Unit which is needed replacement, or both of them.
8. Install a new Brake Belt or a Brake Unit and reverse the above steps to complete installation.

Note: When the Brake Unit is replaced, following adjustments should be checked. (Refer to sections "FITTING ADJUSTMENT OF CASSETTE UP HOLDER" and "ADJUSTMENT OF EJECT CLEARANCE" for details.)

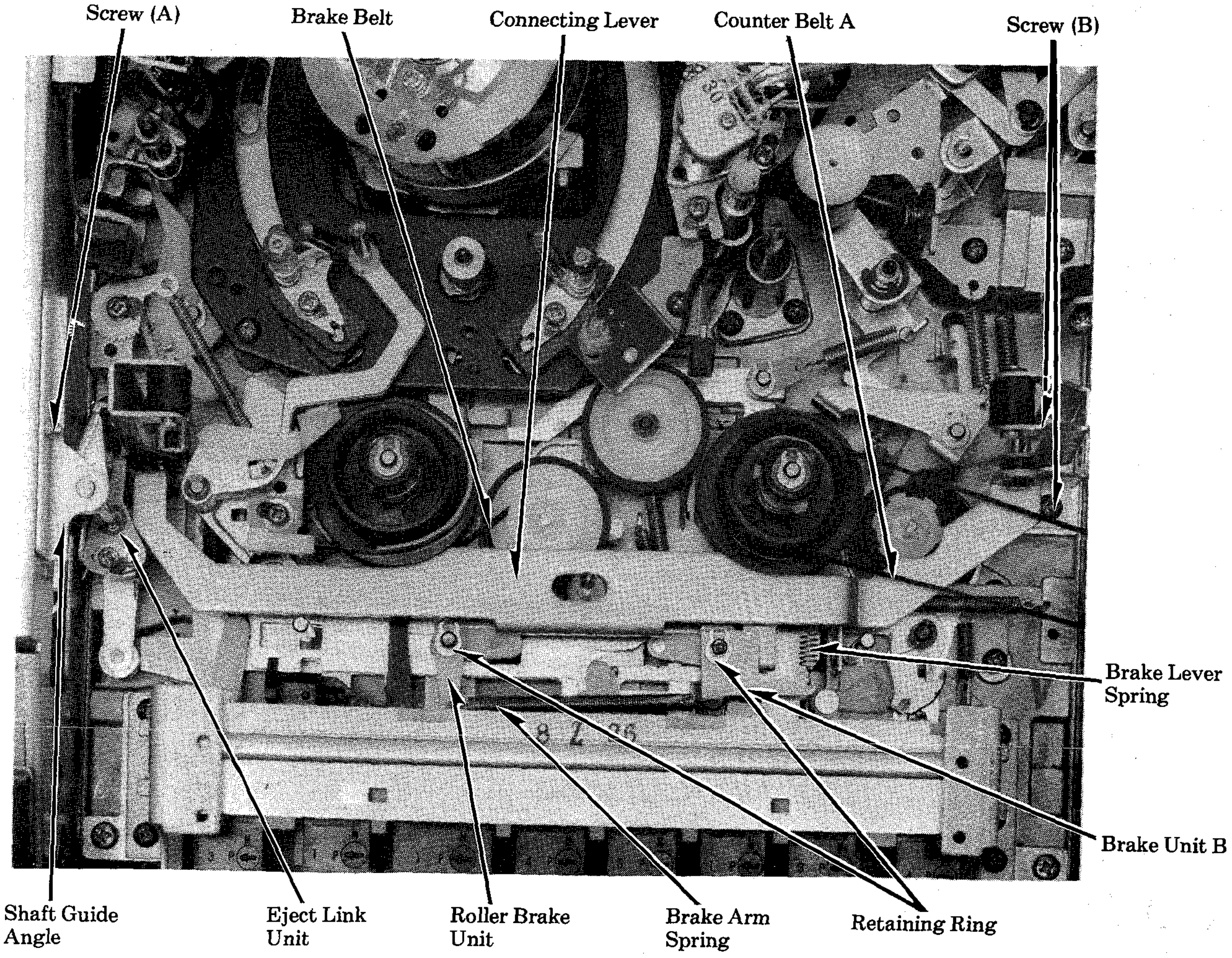

Screw (A)
Brake Belt
Connecting Lever
Counter Belt A
Screw (B)
Brake Lever Spring
Brake Unit B
Shaft Guide Angle
Eject Link Unit
Roller Brake Unit
Brake Arm Spring
Retaining Ring

Fig. 32

10. REPLACEMENT AND ADJUSTMENT OF THE CASSETTE ARM UNITS A & B

A. Replacement Procedure

1. Remove the Top Panel, Cassette Guide and Cassette Compartment. (Refer to section "DISASSEMBLY METHOD", Items 2-1, 2-7 and 2-10).
2. Remove the Counter Belt A.
3. Unscrew the screw (A), remove Shaft Guide Angle and Eject Link Unit.
4. Unscrew the 2 screws (B) and 2 screws (C) and remove the Connecting Lever with the Cassette Arm Unit A and B.
5. Remove Retaining Ring (S) which secures Cassette Arm Unit on the Connecting Lever.
6. Remove the Cassette Arm Unit A or B which is needed replacement, or both of them.
7. Install a new Cassette Arm Unit and reverse the above steps to complete the installation.

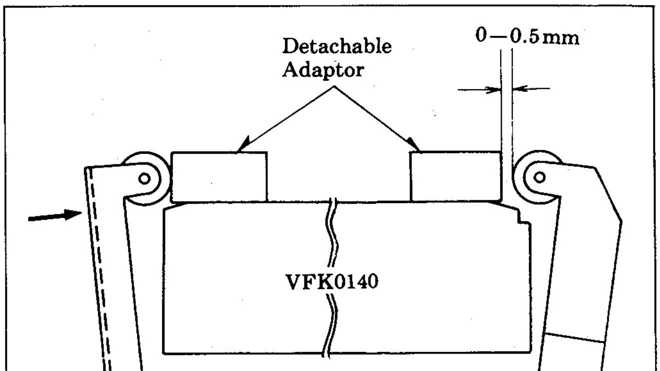
B. Adjustment Procedure

* *Equipment Required*

Cassette Arm Adjusting Jig (VFK0140)

1. Install new part, tighten 2 screws (B) and set 2 screws (C) temporally.
2. Install the eject Link Unit, Shaft Guide Angle and tighten screw (A).
3. Place the Cassette Arm Adjustment Jig with detachable adaptor on the righthand holes.
4. Adjust the position of Cassette Arm Unit to have the specified clearance (0—0.5mm) between Roller and jig, then tighten 2 screws (C).

Note: When the Cassette Arm Units are replaced, following adjustments should be checked. (Refer to sections "FITTING ADJUSTMENT OF CASSETTE UP HOLDER" and "ADJUSTMENT OF EJECT LINK CLEARANCE" for details.


Detachable Adaptor
0—0.5mm
VFK0140

(The thickness of the cover from an ordinary pack of book matchess is about 0.3mm.)

Fig. 33

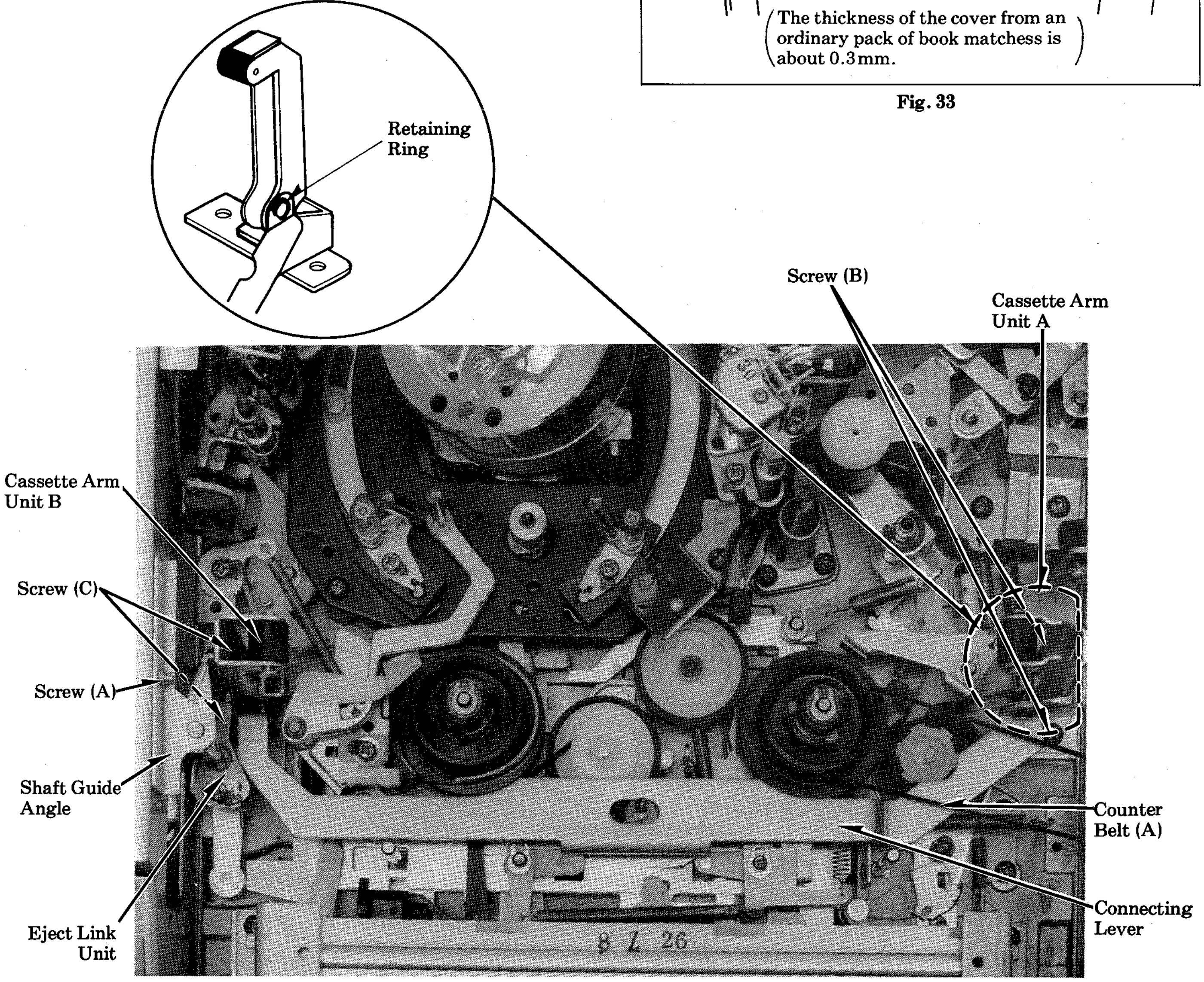

Retaining Ring
Screw (B)
Cassette Arm Unit A
Cassette Arm Unit B
Screw (C)
Screw (A)
Shaft Guide Angle
Eject Link Unit
Counter Belt (A)
Connecting Lever

Fig. 34

11. REPLACEMENT OF THE PRESSURE ROLLER UNIT

Replacement Procedure

1. Remove the spring A.
2. Remove the Retaining ring (B), and remove the Pressure roller unit.
3. Install new pressure roller unit.

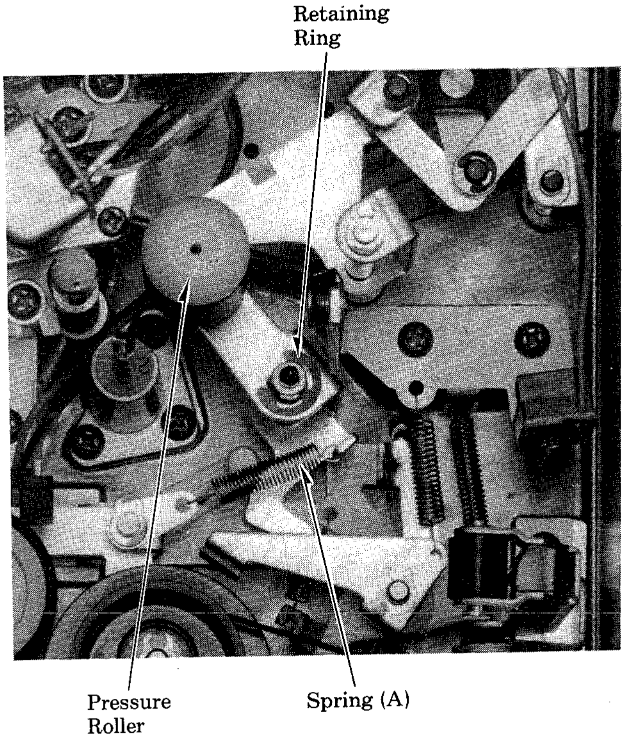

Retaining Ring
Pressure Roller
Spring (A)

Fig. 35

12. REPLACEMENT AND ADJUSTMENT OF THE CAPSTAN HOLDER

A. Replacement Procedure

1. Remove the Top Panel, Cassette Guide and Cassette Compartment. (Refer to section "DISASSEMBLY METHOD", Items 2-1, 2-7 and 2-10).
2. Remove the Pressure Roller Unit. (Refer to section "REPLACEMENT OF PRESSURE ROLLER UNIT").
3. Remove the Oil Cap, Oil Pool, unscrew the 3 screws (A) and remove the Capstan Holder.
4. Install a new Capstan Holder and reverse the above steps to complete the installation.

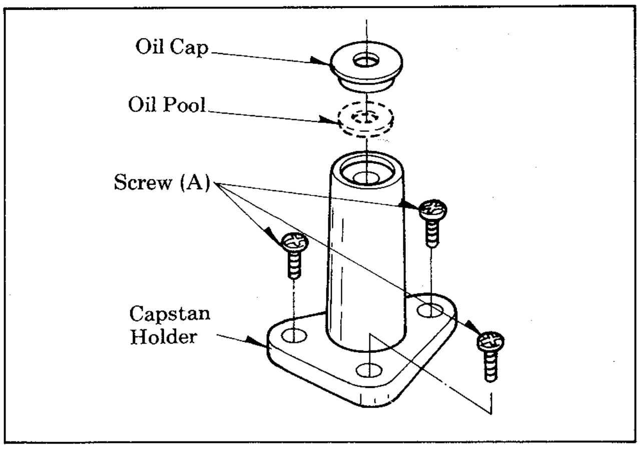

Oil Cap
Oil Pool
Screw (A)
Capstan Holder

Fig. 36

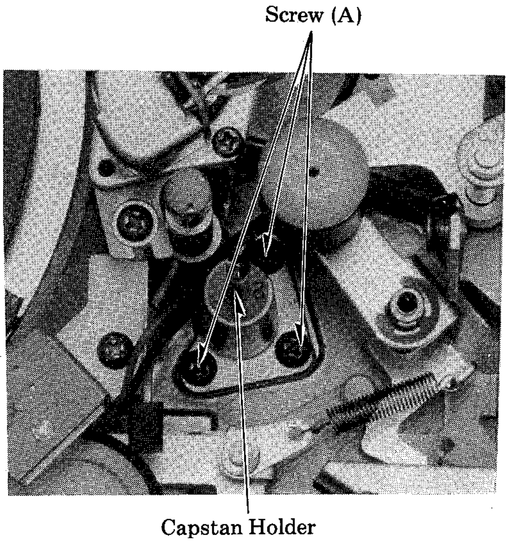

Screw (A)
Capstan Holder

Fig. 37

B. Adjustment Procedure

* *Equipment Required*

Capstan Reference Plate (VFK0141)

1. Install new Capstan Holder and set the 3 screws (A) temporally.
2. Place the jig, press and fit the Capstan Holder against the jig.
3. Tighten the 3 screws (A).

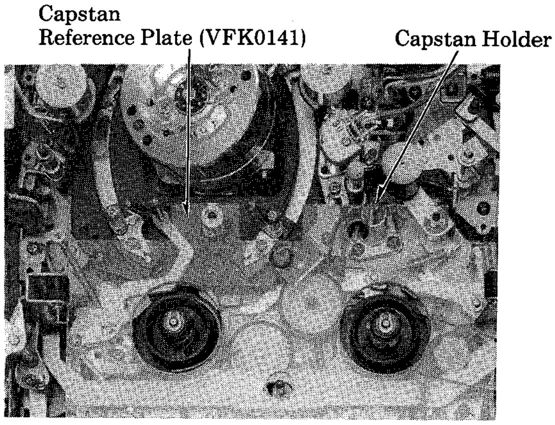

Capstan Reference Plate (VFK0141)
Capstan Holder

Fig. 38

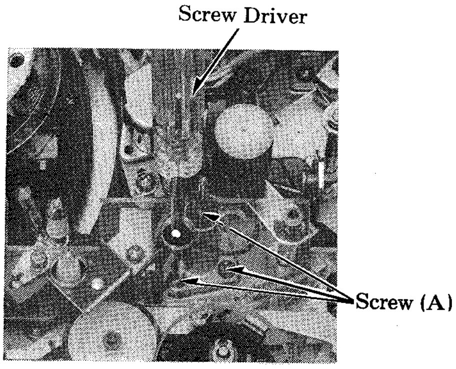

Screw Driver
Screw (A)

Fig. 39

Note: When the Capstan Holder is replaced, following adjustments should be checked. (Refer to sections "ADJUSTMENT OF PRESSURE ROLLER UNIT", "FITTING ADJUSTMENT OF CASSETTE UP HOLDER" for details).

13. REPLACEMENT OF PRESSURE ROLLER SOLENOID/ ADJUSTMENT OF SPRING HOOK LEVER AND CONFIRMATION OF PRESSING FORCE

A. Replacement Procedure

* *Equipment Required:*
Retaining Ring Remover—4 mm (VFK0145)

1. Remove the Top Panel and the Shield Panel. (Refer to section "DISASSEMBLY METHOD", Item 2-1 and 2-11).
2. Unscrew the 2 screws (A), remove the 2 screws (B) and Spring Hook Angle (C).
3. Remove the 2 Retaining Rings (D) and Connecting Lever B Unit (E).
4. Unscrew the 3 screws (F) and remove the Roller Solenoid with Bracket.
5. Unsolder the 2 lead wires (brown and white) from the solenoid.
6. Unscrew the 2 screws (G) and remove the Solenoid Bracket (H), Retaining Ring (I), Rivet (J) and Solenoid Lever (K).

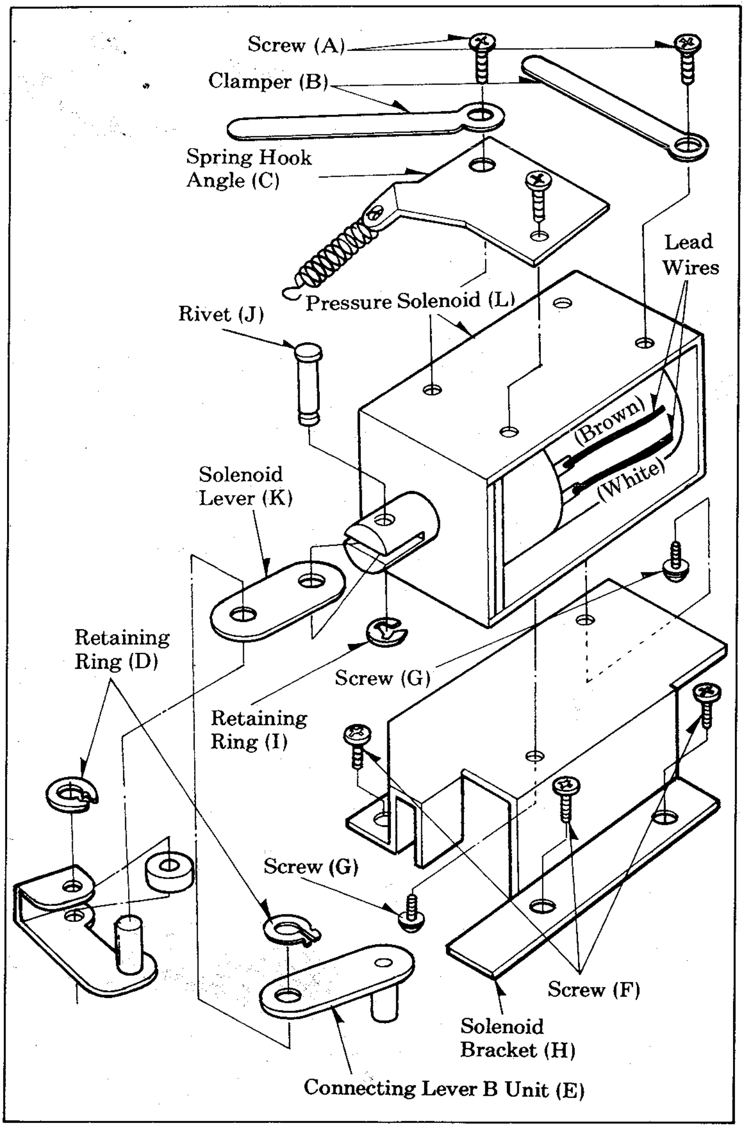

Screw (A)
Clamper (B)
Spring Hook Angle (C)
Rivet (J)
Pressure Solenoid (L)
Lead Wires
(Brown)
(White)
Solenoid Lever (K)
Retaining Ring (D)
Screw (G)
Retaining Ring (I)
Screw (G)
Screw (F)
Solenoid Bracket (H)
Connecting Lever B Unit (E)

Fig. 40

7. Remove the Pressure Solenoid (L).
8. Install a new Pressure Solenoid and reverse the above steps to complete the installation.

B. Adjustment Procedure

1. Remove the Top Panel, Shield Panel, Rear Panel, Side Panels and Front Panel. (Refer to section "DISASSEMBLY METHOD", Items 2-1, 2-2, 2-4, 2-5 and 2-11).
2. Unscrew the 6 red screws (A) and remove the tuner block

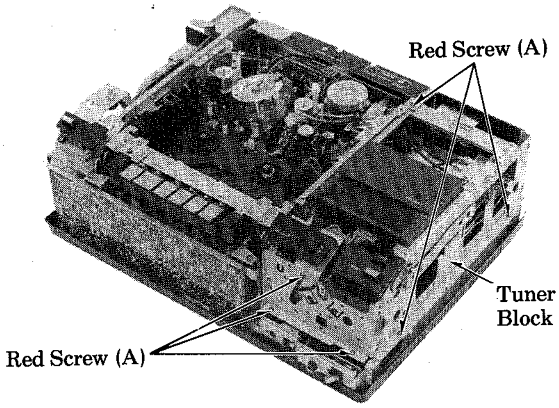

Red Screw (A)
Tuner Block
Red Screw (A)

Fig. 41

3. Press the Solenoid Cylinder with finger to make the PLAY mode, and adjust the screw (B) to have the proper clearance (0.2—0.5 mm)

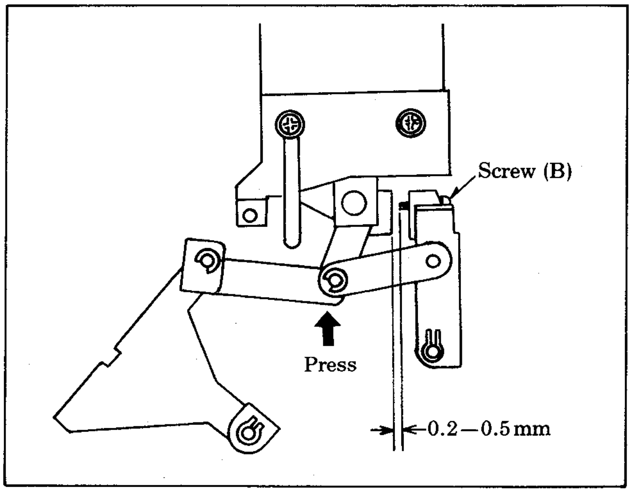

Screw (B)
Press
0.2—0.5 mm

Fig. 42

C. Confirmation Procedure

* *Equipment Required:*
Fan-type Tension Gauge (VFK66)

1. Playback the Cassette Tape.
2. Set a fan-type Tension Gauge to the part (A) of Pressure Lever.
3. Press the Lever with gauge, in the direction indicated by the arrow.
4. Confirm that the tensionmeter reading is 2000±200g at the moment tape stops.

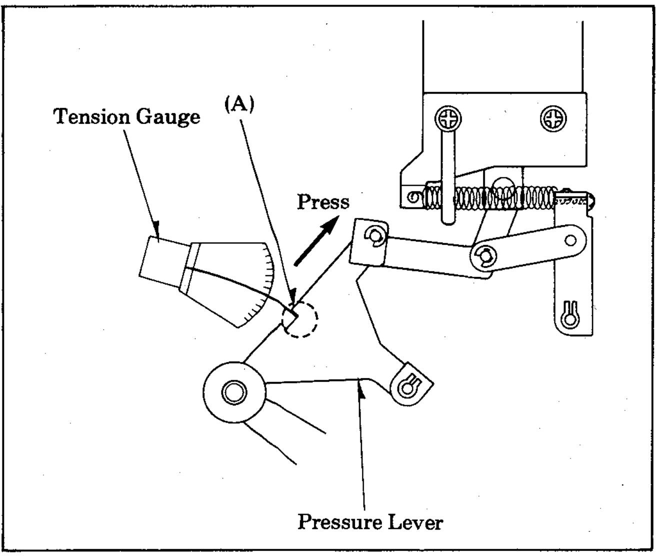

Tension Gauge
(A)
Press
Pressure Lever

Fig. 43

14. POSITION ADJUSTMENT OF TENSION POST

A. Measurement Procedure

* *Equipment Required:*
Ruler

1. Remove the Top Panel, Cassette Guide and Cassette Compartment. (Refer to section, "DISASSEMBLY METHOD", Items 2-1, 2-7 and 2-10).
2. Turn power switch ON.
3. Blind the Supply Photo Transistor (TR6302) with a finger, and press the PLAY button for loading.
4. As soon as loading is completed, turn power switch OFF and repress the PLAY button.
5. Make sure that the Head Cylinder stopped completely, and measure the length.

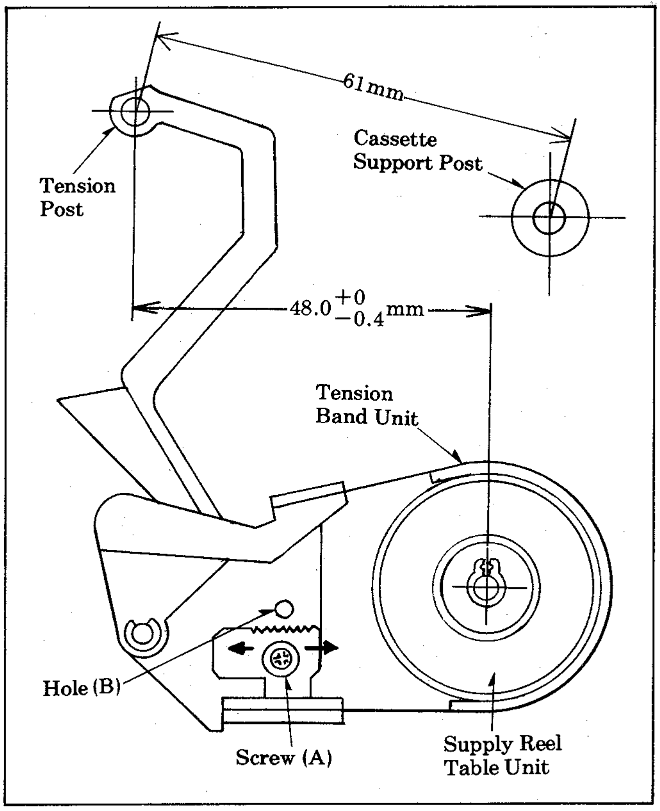

61mm
Tension Post
Cassette Support Post
$48.0^{+0}_{-0.4}$mm
Tension Band Unit
Hole (B)
Screw (A)
Supply Reel Table Unit

Fig. 44

B. Adjustment Procedure

* *Equipment Required:*
Fine Adjustment Screwdriver (VFK0136) Screwdriver (+).
(TENSION POST)
Loosen the screw (A) set a fine adjustment screwdriver to the Hole (B) and adjust the position by displacing the Tension Band Bracket in the directions indicated by arrow.
Notes:

1. After adjustment, playback a cassette tape and make sure that the tape does not come into contact with cassette case when it is loading.
2. Upon completion of the adjustment, "FITTING ADJUSTMENT OF CASSETTE UP HOLDER" also should be checked.

15. ADJUSTMENT OF CASSETTE SUPPORT HEIGHT

Adjustment Procedure

* *Equipment Required:*
Post Adjustment Plate (VFK0138)
Hex Wrench—1.5mm (VFK76)

1. Remove the Top Panel, Cassette Guide, and Cassette Compartment. (Refer to section "DISASSEMBLY METHOD" Items 2-1, 2-7 and 2-10).

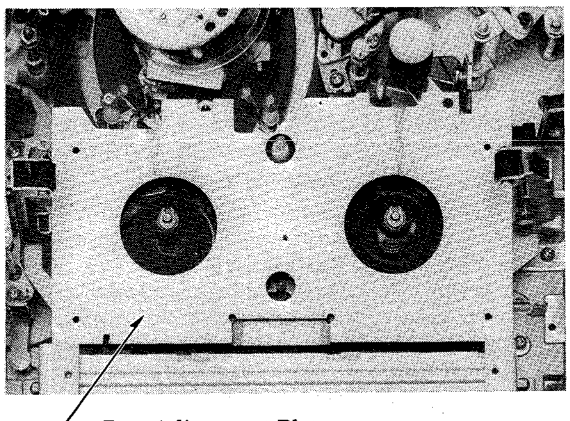

Post Adjustment Plate

Fig. 45

2. Place the Post Adjustment Plate to the proper position and loosen a hex screw.
3. Adjust the height of the cassette support so that it has no clearance between the plate and cassette support, then tighen the hex screw.

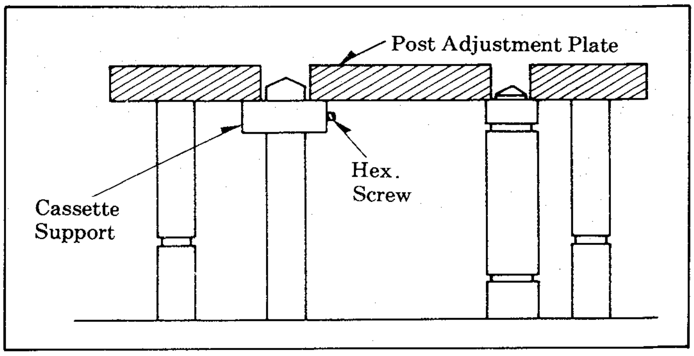

Post Adjustment Plate
Hex. Screw
Cassette Support

Fig. 46

Note: Upon completion of adjustment, "ADJUSTMENT OF CASSETTE UP HOLDER" also should be checked.

16. REPLACEMENT AND HEIGHT ADJUSTMENT OF REEL TABLES

A. Replacement Procedure

* *Equipment Required:*

Retaining Ring Remover—4mm (VFK0145)

Remove the Top Panel, Cassette Guide and Cassette Compartment. (Refer to section "DISASSEMBLY METHOD", Items 2-1, 2-7, and 2-10).

(TAKEUP REEL TABLE UNIT)

1. Remove the Counter Belt B.
2. Remove the Retaining Ring, washer and then the Takeup Table unit can be removed.

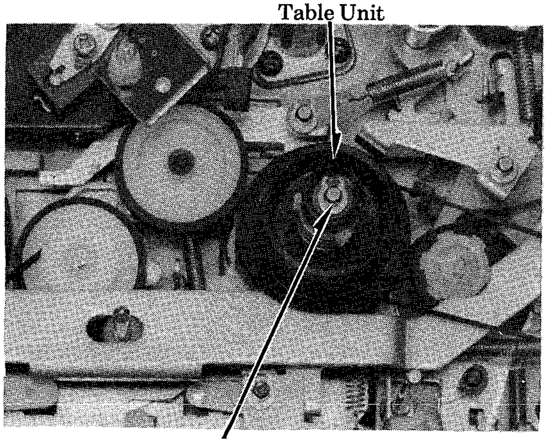

Takeup Reel
Table Unit
Retaining Ring

Fig. 47

(SUPPLY REEL TABLE UNIT)

1. Remove the 2 Retaining Rings and 2 washers.
2. Remove the Tension Arm Unit from the shaft and remove the tension spring. And then, remove the Supply Reel Table Unit.
3. Install a new Reel Table and reverse the above steps to complete the installation.

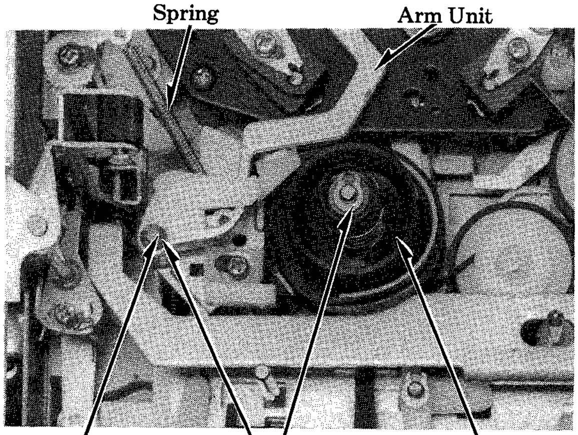

Tension
Spring
Tension
Arm Unit
Shaft
Retaining Ring
Supply Reel
Table Unit

Fig. 48

Notes:

1. Do not put any oil or grease on the Counter Belt, Reel Tables, Idlers or Brake Shoes.
2. Upon completion of adjustment, "FITTING ADJUSTMENT OF CASSETTE UP HOLDER" also should be checked.

B. Height Adjustment Procedure

* *Equipment Required:*

Post Adjustment Plate (VFK0138)

Reel Table Height Jig (VFK0139)

Hex Wrench—1.5mm (VFK76)

1. Place the Post Adjustment Plate in its proper position.

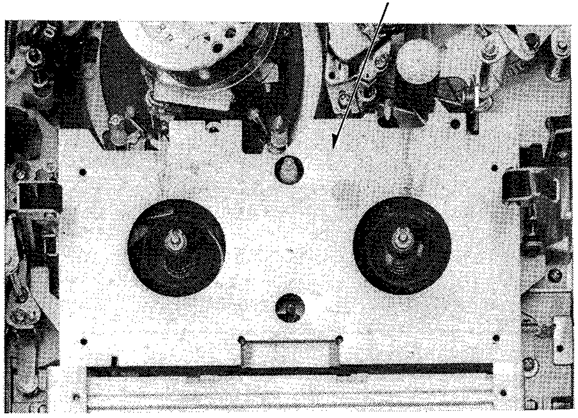

Post Adjustment Plate

Fig. 49

2. Set the Dial Gauge into the U-shaped Block and place it on the Adjustment Plate.
3. Fit the sensor of Dial Gauge on the cut-out of the adjustment plate, and set the pointer to 0 (Zero).

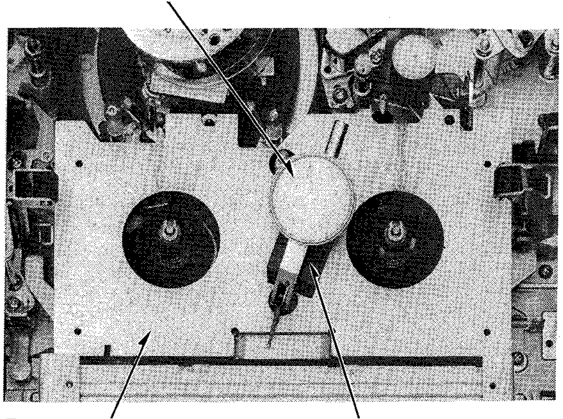

Dial Gauge
Post Adjustment Plate
U-Shaped Block

Fig. 50

4. Fit the sensor of Dial Gauge on the top of Reel Table and take the reading of the gauge.
5. When the difference of the reading is more than 0.1 mm, it suggests that the adjustment is needed.

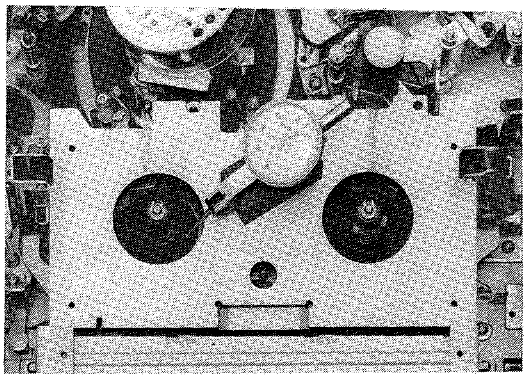


Fig. 51

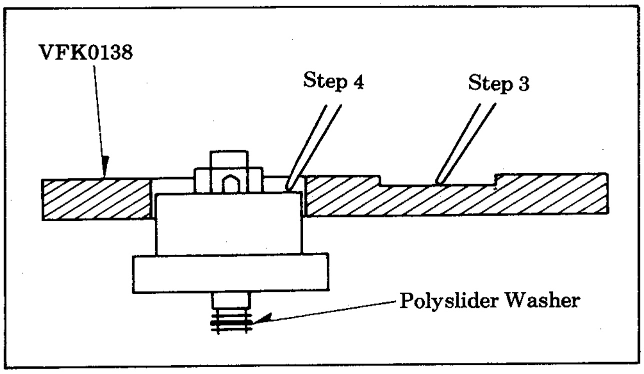


Fig. 52

6. Change the polyslider washer. (The washer is available in in sizes of t=0.13 mm, 0.25 mm and 0.5 mm).

   0.13 mm......XWXV4Z65
   0.25 mm......XWXV4A65
   0.5 mm XWXV4D65

Note: Upon completion of replacement and adjustment, "ADJUSTMENT OF CASSETTE UP HOLDER" also should be checked.

17. CONFIRMATION OF TAKEUP FORCE

* *Specifications:*

in PLAY......130—170 g-cm
in F.F ......350 g-cm
in REW ......400 g-cm

Confirmation Procedure

* *Equipment Required:*

Dial Torque Gauge	(VFK0133)
Adaptor	(VFK0134)

1. Remove the Top Panel and Cassette Cover. (Refer to section "DISASSEMBLY METHOD", Items 2-1 and 2-6).
2. Attach the Adaptor to the Torque Gauge.

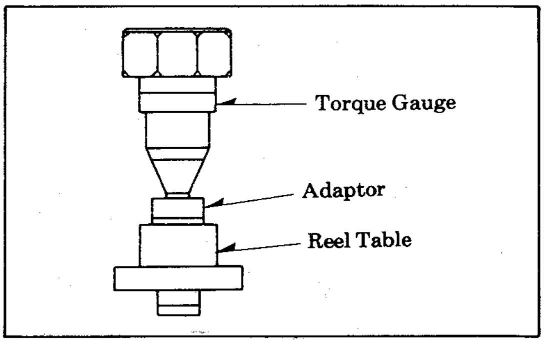


Fig. 53

3. Turn power switch ON.
4. Blind photo transistor (TR6302, TR6303) with a piece of opaque paper or black tape.
5. Set a Torque Gauge to the Reel Table, press the PLAY button, and take the read of gauge.
6. Make the same measurement for F.F. and Rew. modes.

Notes:

1. When measuring, make sure that there is no slippage between Idler and Reel Table as well as Idlers.
2. When measuring, the weight of Torque Gauge should be free against Reel Tables.
3. Remove piece of paper after confirmation.

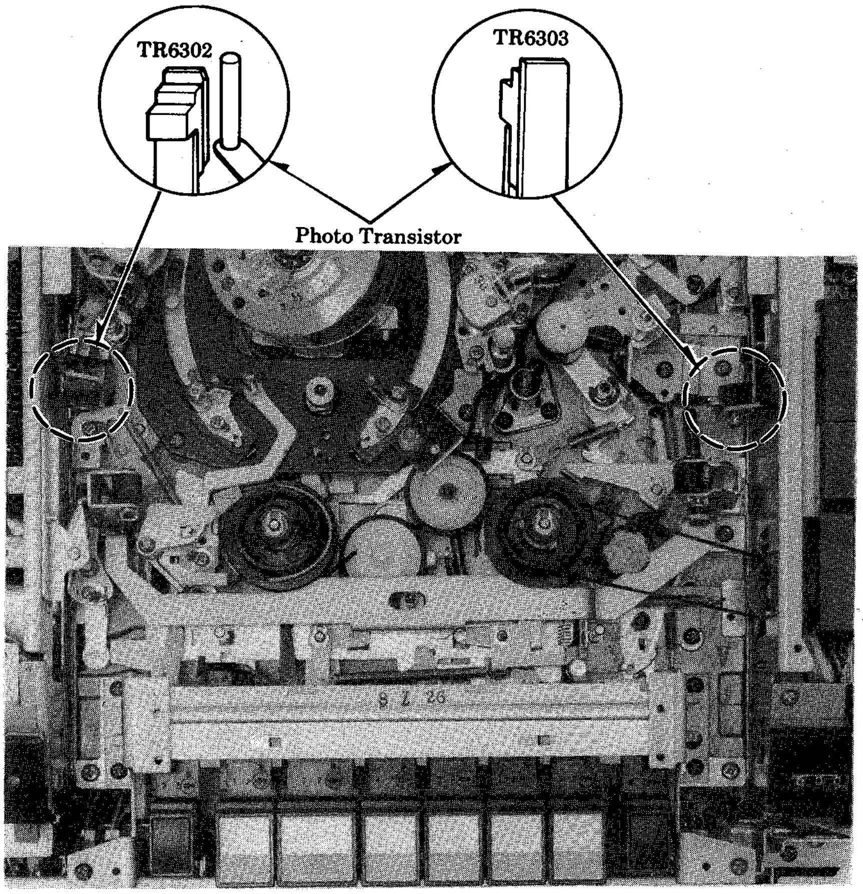


Fig. 54

18. ADJUSTMENT OF TAPE GUIDE POST HEIGHT

Adjustment Procedure

* *Equipment Required:*
Post Adjustment Plate (VFK0138)
Post Adjustment Screwdriver (VFK0137)
Block Gauge (VFK0139)

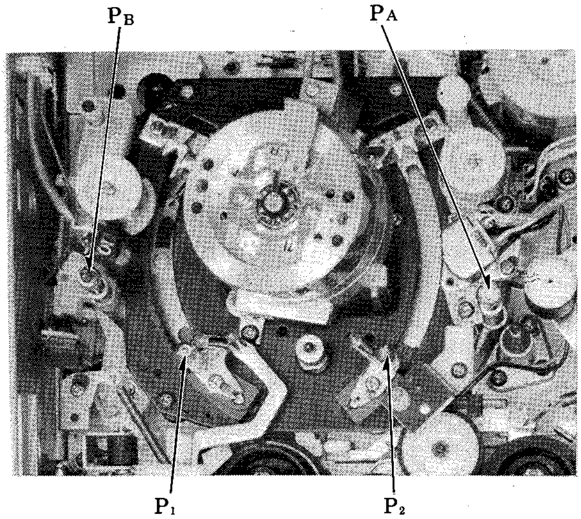


Fig. 55

1. Remove the Top Panel, Cassette Guide and Cassette Compartment. (Refer to section "DISASSEMBLY METHOD", Items 2-1, 2-7 and 2-10).
2. Place the Post Adjustment Plate to the proper position and put the Block Gauge on it.

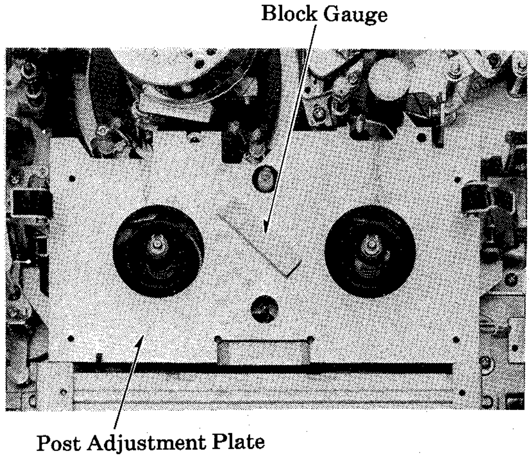

Block Gauge
Post Adjustment Plate

Fig. 56

3. Fit the block gauge against each post.

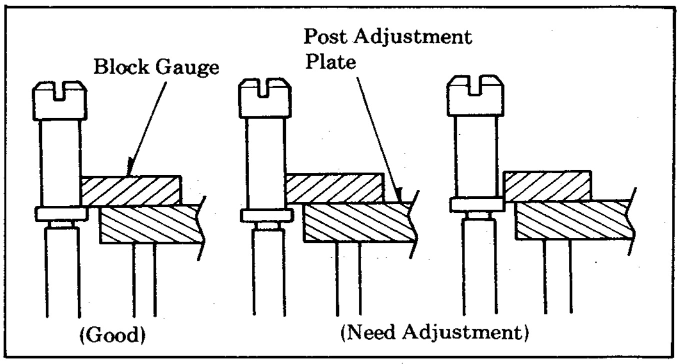

Block Gauge
Post Adjustment Plate
(Good)
(Need Adjustment)

Fig. 57

4. Loosen the locking hex screws of posts, then turn the top of post-1, post-2 with post adjustment screwdriver. Use the box driver for adjustment of post PA, PB.

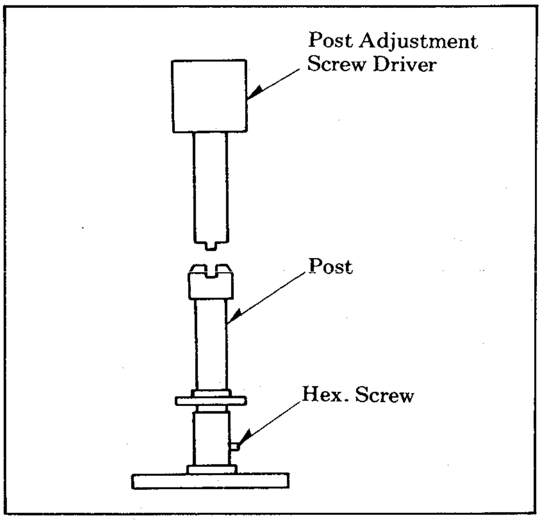

Post Adjustment Screw Driver
Post
Hex. Screw

Fig. 58

Note: Upon completion of adjustment, "ADJUSTMENT OF CASSETTE UP HOLDER" also should be checked.

19. REPLACEMENT OF BUTTON UNIT AND EACH BUTTON

Replacement Procedure

1. Remove the Top Panel, Front Panel, Cassette Guide and Cassette Compartment. (Refer to section "DISASSEMBLY METHOD", Items 2-1, 2-4, 2-5, 2-7 and 2-10).
2. Unscrew the 4 screws (A) on the Transport Board (VEP 0669H1), also disconnect the 5 connectors and remove the board.

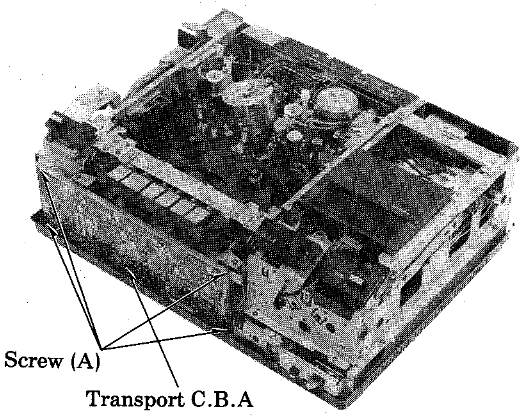

Screw (A)
Transport C.B.A

Fig. 59

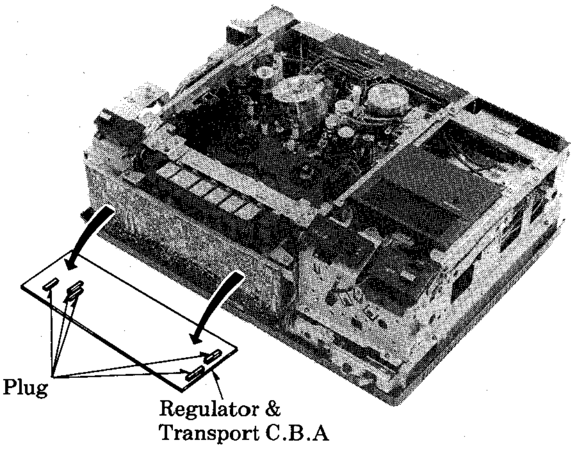

Plug
Regulator & Transport C.B.A

Fig. 60

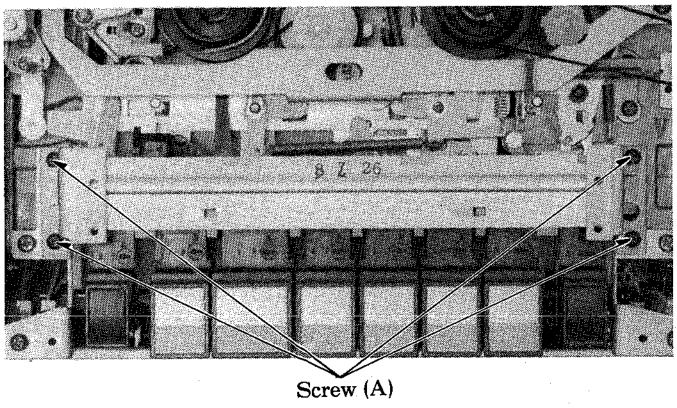


Fig. 61

3. Disconnect the connector P622 for stop solenoid inter connection.
4. Unscrew the 4 screws (A) securing the button unit, remove the button unit from the chassis.
5. Remove the each Button that needs replacement.
6. Install a new button and reverse the above steps to complete the installation.

Note: Upon completion of adjustment, "ADJUSTMENT OF CASSETTE UP HOLDER" also should be checked.

20. REPLACEMENT OF TIMER UNIT

Replacement Procedure

1. Unscrew the 2 screws (A).
2. Unplug the connection plug and remove the Timer Unit.
3. Install a new Timer Unit and reverse the above steps to complete the installation.

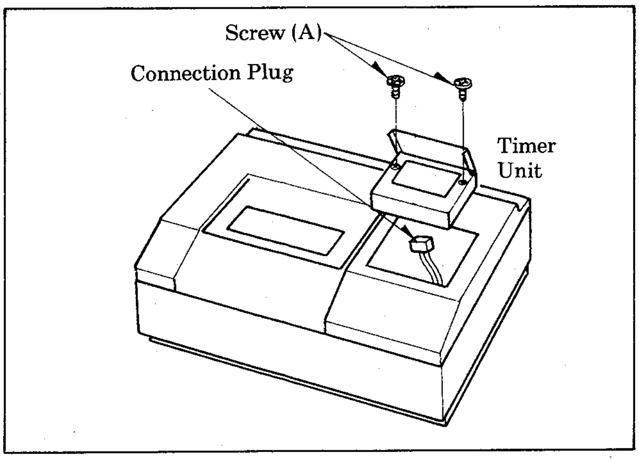

Screw (A)
Connection Plug
Timer Unit

Fig. 62

21. REPLACEMENT OF TAPE COUNTER

Replacement Procedure

1. Remove the Top Panel, Rear Panel, Side Panels and Front Panel. (Refer to section "DISASSEMBLY METHOD", Items 2-1, 2-2, 2-4 and 2-5).

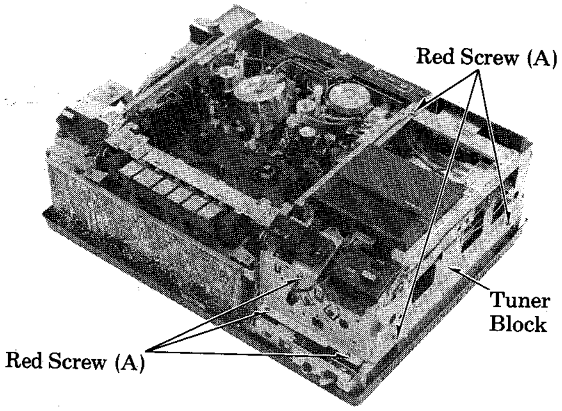

Red Screw (A)
Tuner Block
Red Screw (A)

Fig. 63

2. Unscrew the 2 screws (B) and remove the Counter Cover.

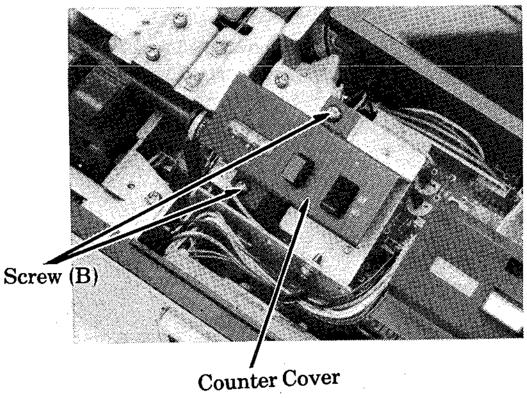

Screw (B)
Counter Cover

Fig. 64

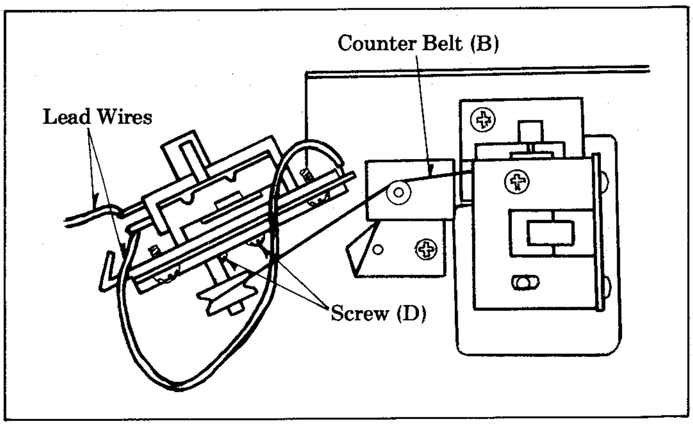

Counter Belt (B)
Lead Wires
Screw (D)

Fig. 65

3. Unsolder the 2 lead wires from the Counter.
4. Unscrew the 2 screws (C) and remove the Counter Base Unit, and take off the Counter Belt B from the Counter Pulley.

5. Unscrew the 2 screws (D) securing the Tape Counter to the counter base. Then remove the Tape Counter.
6. Install a new Tape Counter and reverse the above steps to complete the installation.

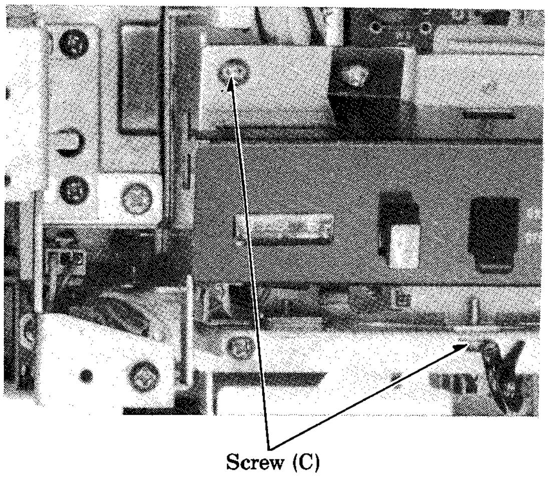


Fig. 66

22. REPLACEMENT OF COUNTER BELT (A & B)

Replacement Procedure

When replacing Belt A, follow the steps 1 and 2.
When replacing Belt B, follow the steps 1 to 6.

1. Remove the Top Panel, Side Panels, Front Panel, Cassette Guide and Cassette Compartment. (Refer to section "DISASSEMBLY METHOD", Items 2-1, 2-4, 2-5, 2-7 and 2-10).
2. Remove the Counter Belt A.

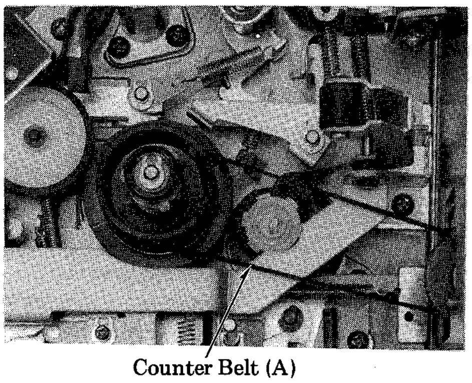

Counter Belt (A)

Fig. 67

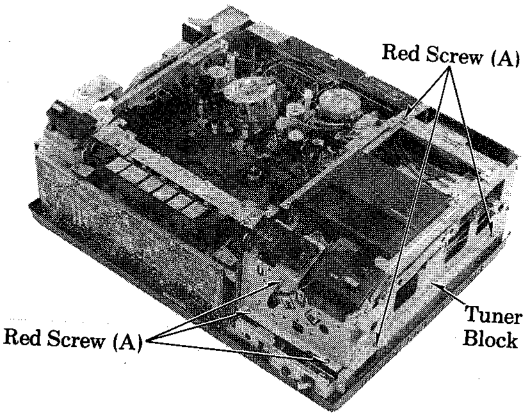

Red Screw (A)
Red Screw (A)
Tuner Block

Fig. 68

3. Remove the Timer Unit.
4. Unscrew the 2 screws (B) and remove the Tape Counter Base Unit, take off the Counter Belt B from the Counter Pulley.

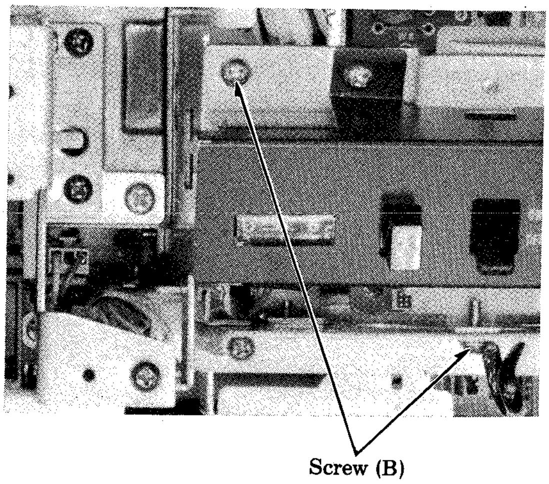


Fig. 69

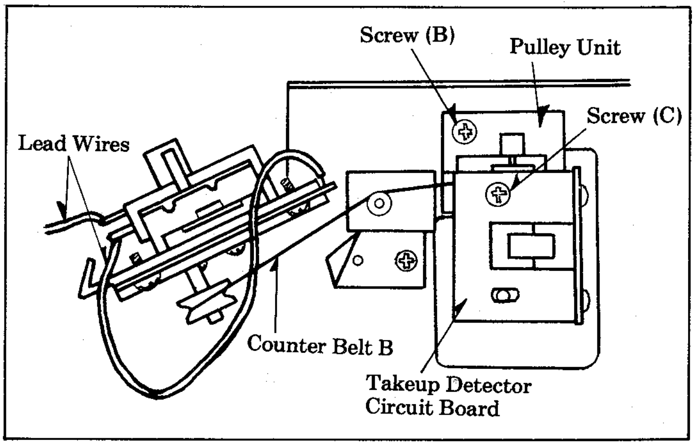

Screw (B)
Pulley Unit
Screw (C)
Lead Wires
Counter Belt B
Takeup Detector Circuit Board

Fig. 70

5. Unscrew the screw (C), remove the Pulley Unit. And then, unscrew the 2 screws (D), remove the takeup detector circuit board.
6. Remove the Counter Belt B.
7. Install a new Belt and reverse the above corresponding steps to complete the installation.

Note: Upon completion of replacement "ADJUSTMENT OF CASSETTE UP HOLDER" also should be checked.

23. REPLACEMENT OF REEL BELT A, B AND CAPSTAN BELT

Replacement Procedure

When replacing Reel Belt A, follow the steps 1 to 4.
When replacing Reel Belt B, follow the steps 1 and 3.
When replacing Capstan Belt, follow the steps 1 to 6.

1. Remove the Bottom Plate and unscrew the 6 screws. (Refer to section "DISASSEMBLY METHOD", Items 2-3 and 2-9).
2. Remove the control Belt from the control pulley unit.
3. Remove the Reel Belt B.
4. Remove the Reel Belt A.
5. Unscrew the 2 screws (B) and remove the Thrust Holder Unit.
6. Remove the Capstan Belt.
7. Install a new belt and reverse the above corresponding steps to complete the installation.

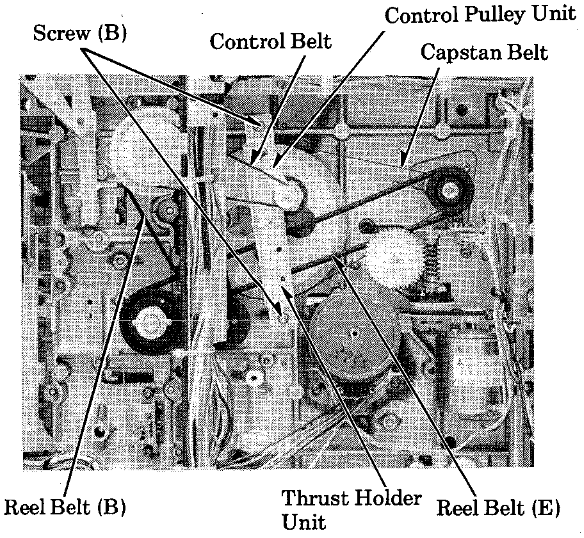

Screw (B)
Control Belt
Control Pulley Unit
Capstan Belt
Reel Belt (B)
Thrust Holder Unit
Reel Belt (E)

Fig. 71

24. REPLACEMENT OF LOADING BELT AND LOADING MOTOR PULLEY UNIT

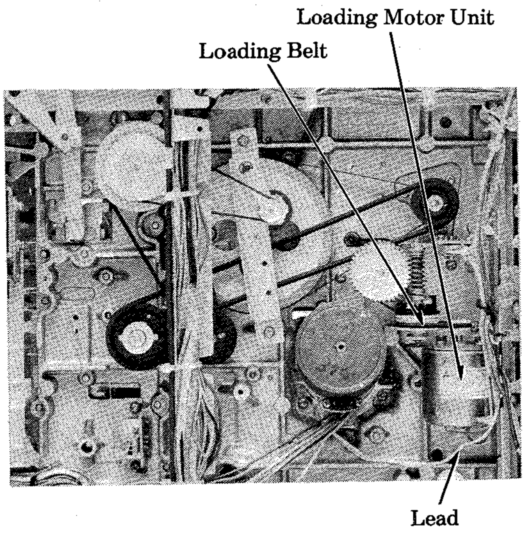

Loading Motor Unit
Loading Belt
Lead

Fig. 72

Replacement Procedure

* *Equipment Required:*
Hex Wrench—2.6mm (VFK48)
When replacing Loading Belt, follow the steps 1 to 3.
When replacing Motor Pulley Unit, follow the steps 1 to 5.

1. Remove the Bottom Plate and unscrew the 6 red screws. (Refer to section "DISASSEMBLY METHOD" Items 2-3 and 2-9).
2. Remove the Loading Belt.
3. Unsolder the 2 lead wires from the Motor.
4. Remove the rivet holding the bottom side circuit boards (VEP0846A & VEP0379A).

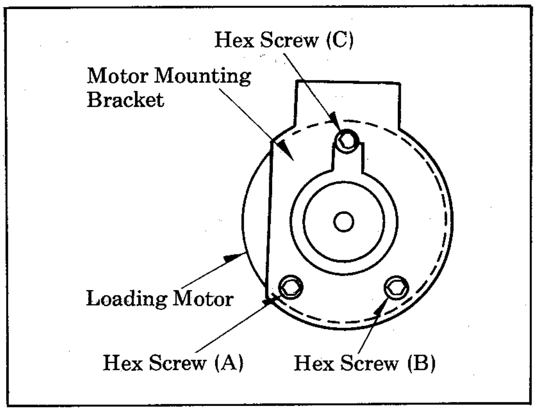

Hex Screw (C)
Motor Mounting Bracket
Loading Motor
Hex Screw (A)
Hex Screw (B)

Fig. 73

5. Unscrew the 2 hex screws (A) and (B), and loosen the hex screw (C).
6. Remove the Loading Motor Pulley Unit.
7. Install a new Loading Motor Pulley Unit and reverse the above steps to complete the installation.

25. REPLACEMENT AND POSITION ADJUSTMENT OF TAPE SLACK SWITCH

A. Replacement Procedure

1. Remove the Bottom Plate and Unscrew the 6 red screws. (Refer to section "DISASSEMBLY METHOD" Items 2-3 and 2-9).
2. Set the unit vertically so that the left side board is facing down.
3. Disconnect the connecting plug (P613) from Micro Switch Connection Board.

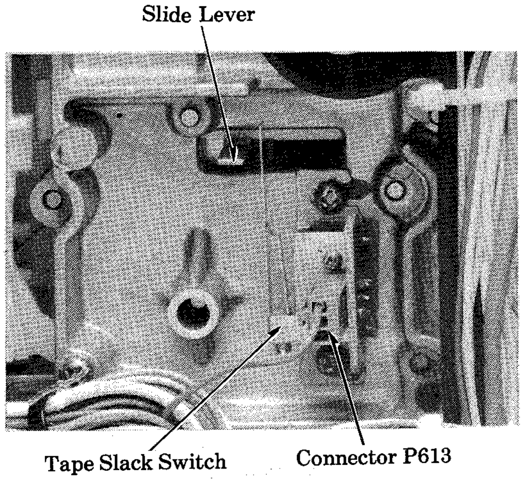

Slide Lever
Tape Slack Switch
Connector P613

Fig. 74

4. Loosen the screw (A) a few turns only, unscrew the screw (B) and remove the Tape Slack Switch.
5. Install new Tape Slack Switch and reverse the above steps to complete the installation.

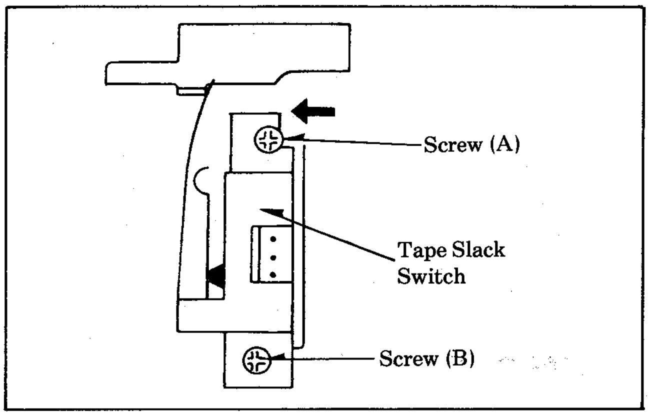

Screw (A)
Tape Slack Switch
Screw (B)

Fig. 75

B. Adjustment Procedure

This switch should turn ON at the moment when the PLAY button latches.

1. Place the switch in its proper position and mount the screw (B) temporally.
2. Press the PLAY button down and lock it.
3. Move the Slack Switch in the direction indicated by the arrow, and tighten both screws at the Slack Switch turns ON.
4. Make sure that the unit begins loading when power switch is turned ON with PLAY Button pressed.

26. REPLACEMENT OF SUPPLY INERTIA ROLLER UNIT

Replacement Procedure

1. Remove the Top Panel and the Shield Panel. (Refer to section "DISASSEMBLY METHOD", Item 2-1 and 2-11).
2. Remove Retaining Ring and Supply Inertia Roller Unit.
3. Remove the Inertia Roller Spring.
4. Install a new Roller Unit and reverse the above steps to complete the installation.

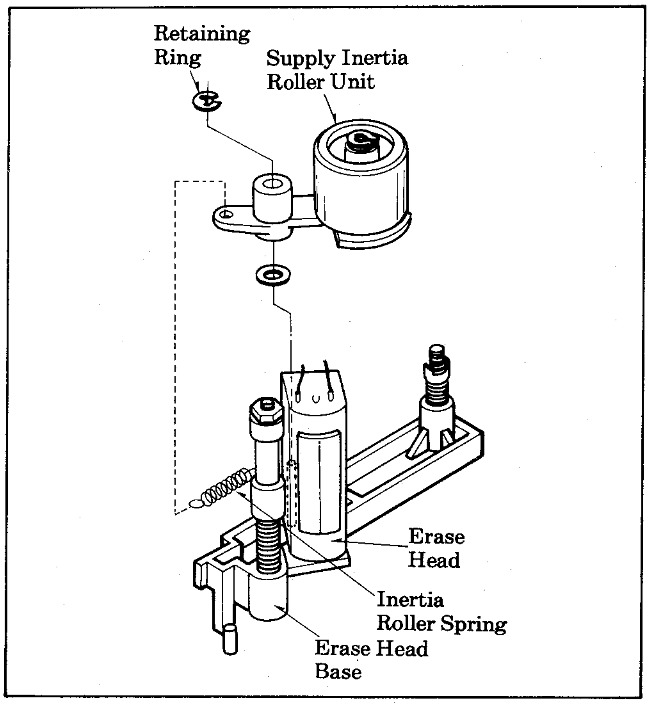

Retaining Ring
Supply Inertia Roller Unit
Erase Head
Inertia Roller Spring
Erase Head Base

Fig. 76

27. REPLACEMENT OF TAKEUP INERTIA ROLLER UNIT

Replacement Procedure

1. Take off the panel support.
2. Pull out the takeup inertia roller unit and remove the inertia roller spring.
3. Install a new Takeup Inertia Roller Unit and reverse the above steps to complete the installation.

Note: Do not put any oil or grease on the surface of the inertia roller.

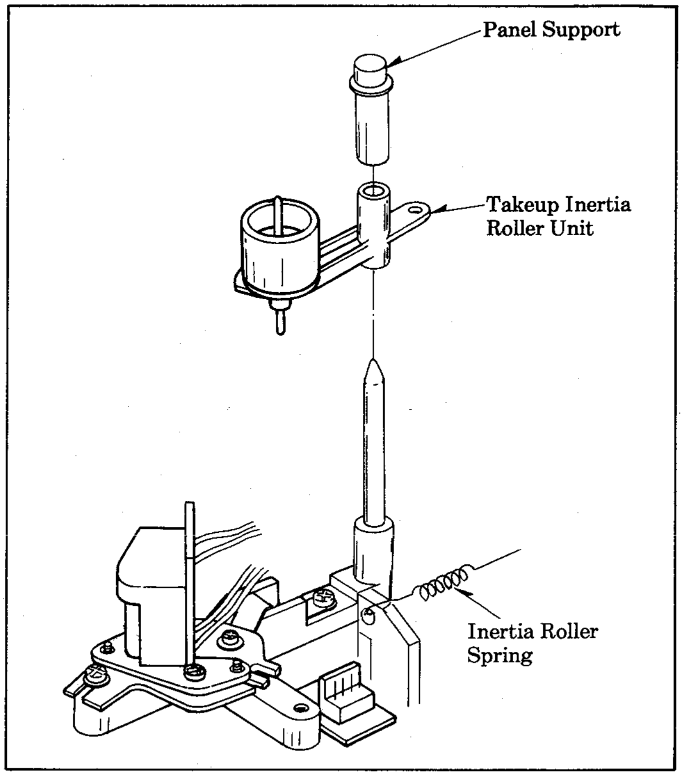

Panel Support
Takeup Inertia Roller Unit
Inertia Roller Spring

Fig. 77

28. TAPE INTERCHANGEABILITY ADJUSTMENT

* *Equipment Required:*
Alignment Tape (VFM8100H3D)
Post Adjustment Screwdriver (VFK0137)
Eccentric Screwdriver (VFK0135)
Hex Wrench—0.9mm (VFK0146)
Hex Wrench—1.5mm (VFK76)
Box Wrench or Plier

A. Pre-adjustment for Posts and Audio/Control Head Height

To prevent the alignment tape from being damaged, use a normal cassette tape for pre-adjustment procedure.

1. Playback a cassette tape and make sure that the edges of the tape are not curling against the edges of the posts P_A, P_1, and P_2, P_B.

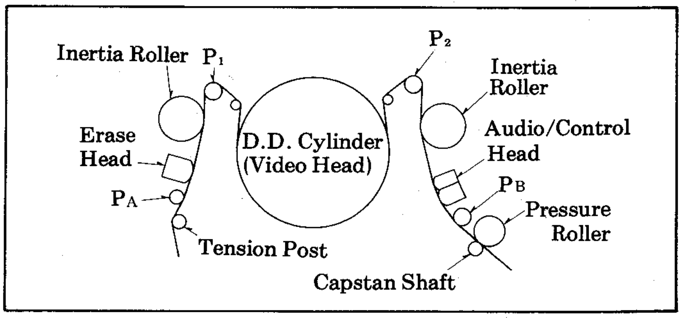

Inertia Roller
P_1
P_2
Inertia Roller
Erase Head
D.D. Cylinder (Video Head)
Audio/Control Head
P_A
P_B
Pressure Roller
Tension Post
Capstan Shaft

Fig. 78

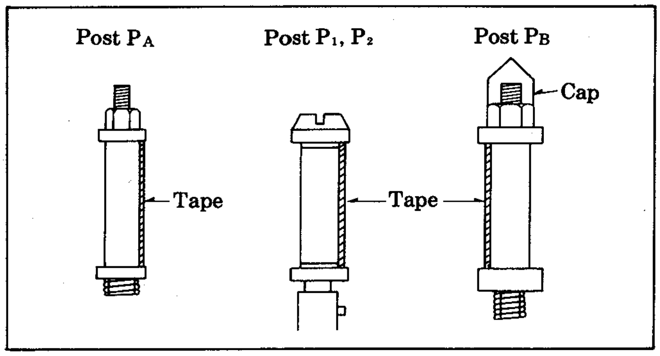

Post P_A
Post P_1, P_2
Post P_B
Cap
Tape
Tape

Fig. 79

2. If curling is appearing, adjust each post as shown below.
   A) When adjusting Post P_1, P_2, use, the Post adjustment screwdriver VFK0137.
   B) When adjusting Post P_A, P_B, tighten an loosen the nut by using box wrench or plier.

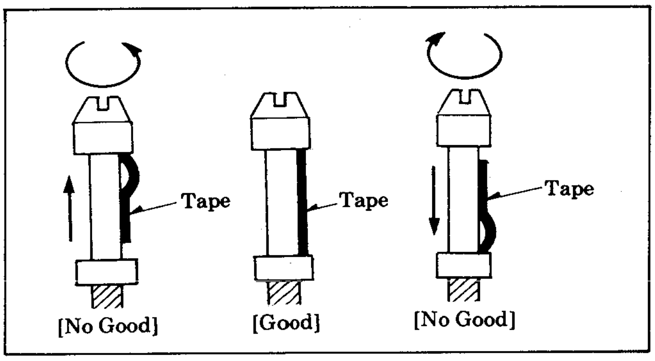

Tape
Tape
Tape
[No Good]
[Good]
[No Good]

Fig. 80

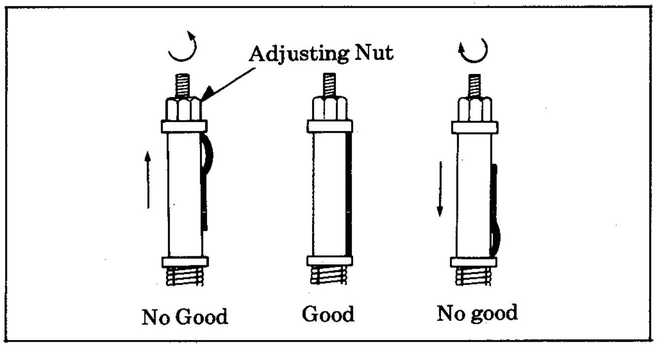

Adjusting Nut
No Good
Good
No good

Fig. 81

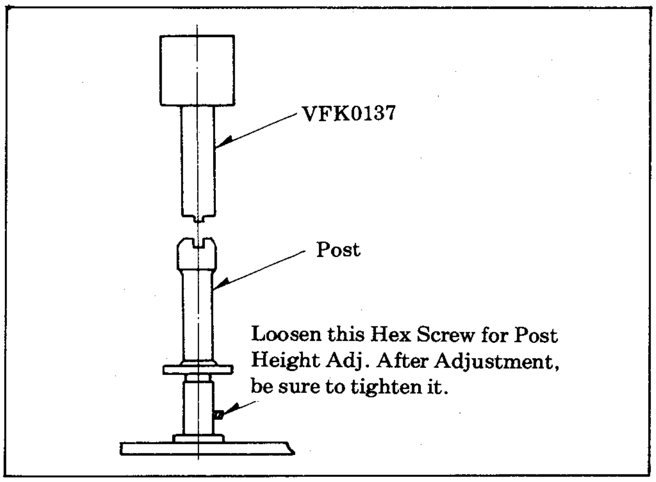

VFK0137
Post
Loosen this Hex Screw for Post Height Adj. After Adjustment, be sure to tighten it.

Fig. 82

3. Adjust the 2 screws (A) and the screw (B) so that the Audio/Control Head height becomes as shown below.

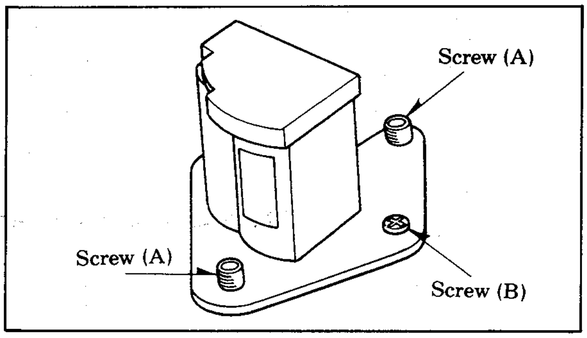

Screw (A)
Screw (A)
Screw (B)

Fig. 83

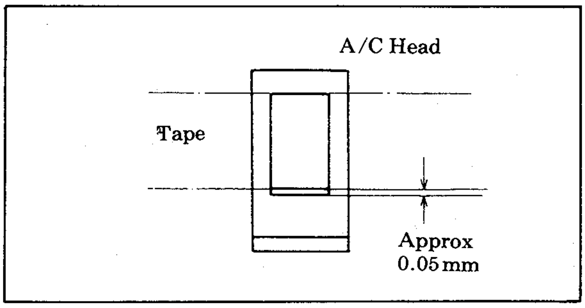

A/C Head
Tape
Approx
0.05 mm

Fig. 84

B. Tape Interchangeability Adjustment

- * Connect an oscilloscope to TP506 on the FM Mod. & Head Amp Board (VEP0536B).
- * Playback the monoscope portion of the alignment tape VFM8100H3D.

B-1. Tape Crease and Slack Adjustment

1. Watch the portions between Post P_1 and A, and between Post P_2 and B carefully.
2. If tape crease or slack is appearing at these position, adjust the position of the inclined base.
   To adjust it, loosen the screw (A) slightly, set the eccentric screwdriver (VFK0135) to the hole (B) and move the base as shown.

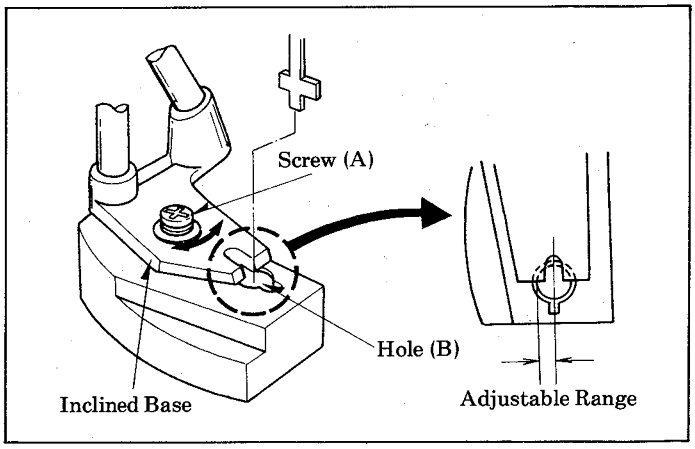

Screw (A)
Hole (B)
Inclined Base
Adjustable Range

Fig. 85

B-2. Post Height Adjustment

While playing back the monoscope portion of the alignment tape VFM8100H3D, adjust posts P_A, P_1 and P_2 by watching the scope display (Test Point: TP506 on the FM Mod. & Head Amp Board) so that the RF envelope on the scope becomes as flat as possible.
($V1/V \geqq 0.7$, $V2/V \geqq 0.7$)

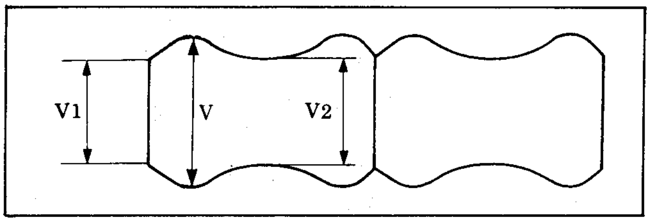
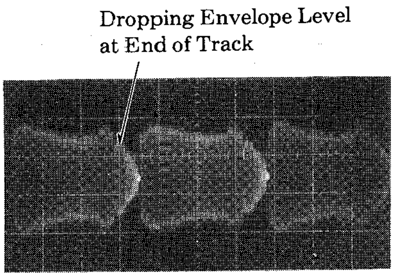
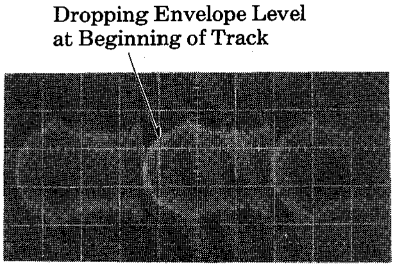


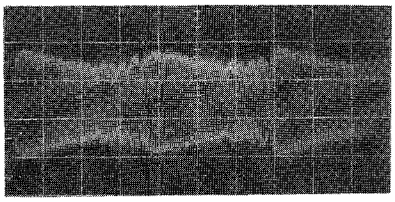
Fig. 86


Dropping Envelope Level at End of Track

No Good
Fig. 87


Dropping Envelope Level at Beginning of Track

No Good
Fig. 88



Good
Fig. 89

B-3. Audio/Control Head Position Adjustment

1. Be sure to set the Tracking Control on the Top Panel to the center position. (Fix Position).
2. (A/C Head Tilt Adjustment).
   While playing back the monoscope portion of the alignment tape VFM8100H3D, adjust the hex screws (A) for the maximum RF envelope on the scope.

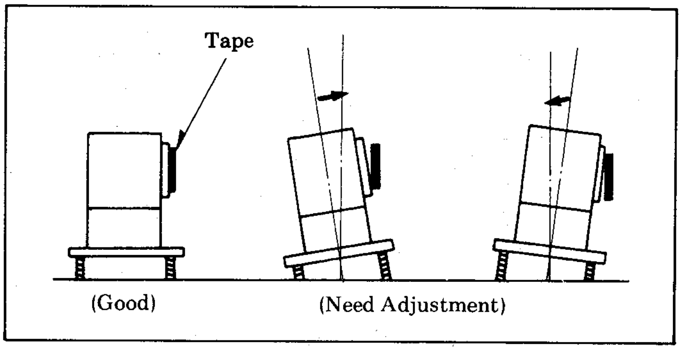


Fig. 90

3. (A/C Head Horizontal Position Adjustment).
   While playing back the monoscope portion of the alignment tape VFM8100H3D, loosen the 2 screws (A) and move the A/C Head horizontally for the maximum RF envelope on the scope.

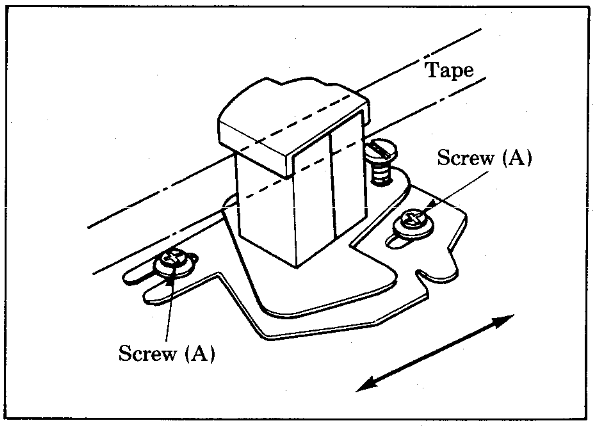
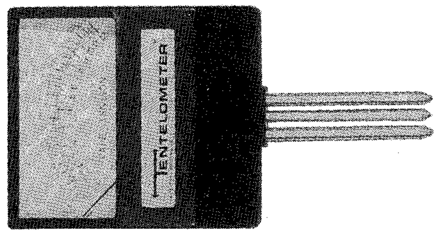
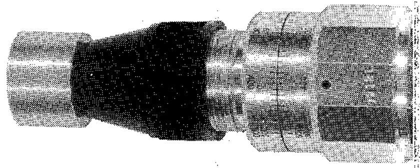
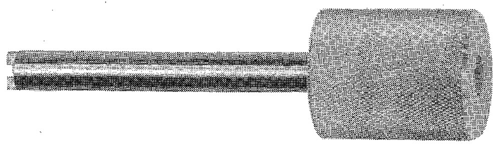
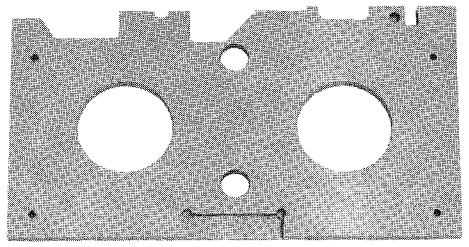
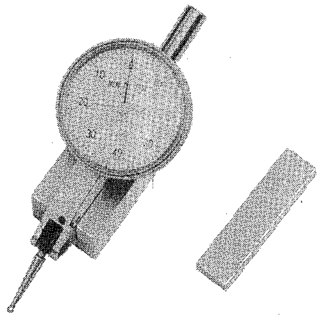
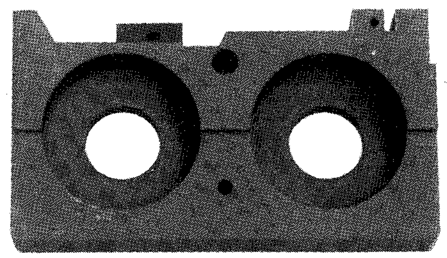
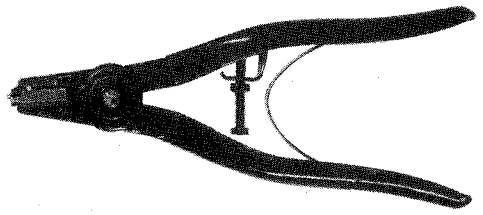
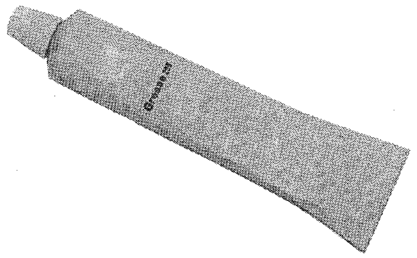


Fig. 91

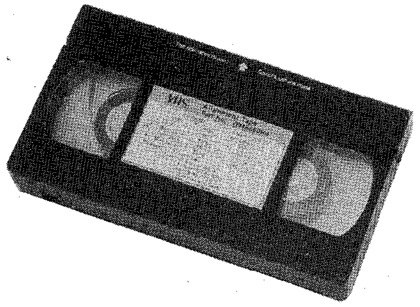
MEMO

Servicing Jigs & To

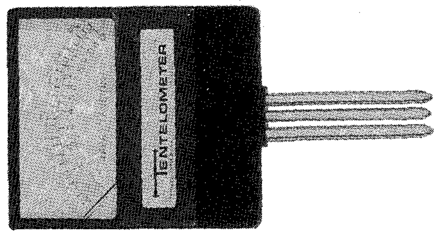
VFM80100H3D VHS Alignment Tape 	Back Tension Meter (Tentelometer, Made in U.S.A.)  	VFK0133 Dial Torque Ga VFK0134 Adaptor for VF 
VFK0137 Post Adjustment Screwdriver 	VFK0138 Post Adjustment Plate 	VFK0139 Reel Table Heig 
VFK0142 Cassette Holder Jig 	VFK0144 Retaining Ring Remover (3mm) VFK0145 Retaining Ring Remover (4mm) 	VFK0146 Hex. Wrench (0.9 VFK75 Hex. Wrench (1.25 VFK76 Hex. Wrench (1.5
VFK66 Fan-type Tension Gauge 	MOR265 Morlytone Grease 	

Servicing Jigs & Tools

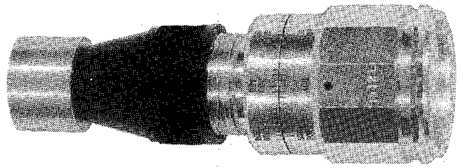
FM80100H3D VHS Alignment Tape



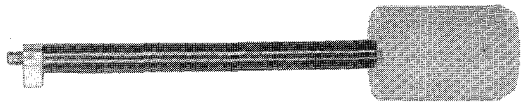
Back Tension Meter
(Tentelometer, Made in U.S.A.)



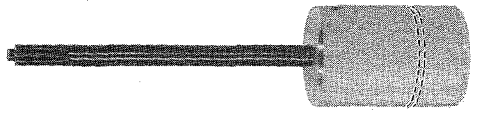
VFK0133 Dial Torque Gauge
VFK0134 Adaptor for VFK0133



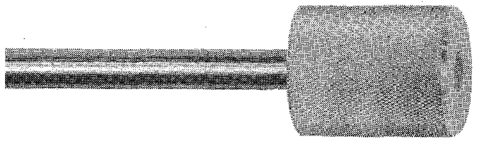
VFK0135 Eccentric Screwdriver



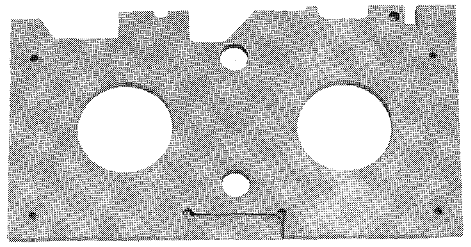
VFK0136 Fine Adjustment Screwdriver



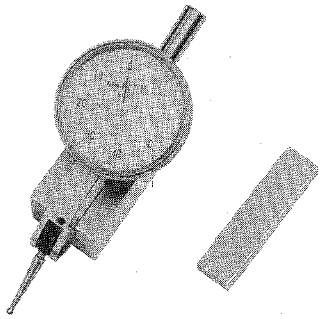
FK0137 Post Adjustment Screwdriver



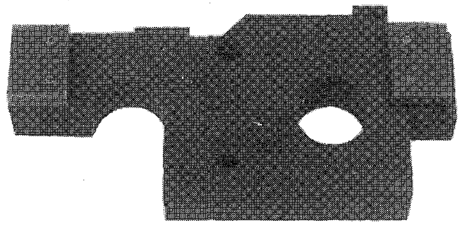
VFK0138 Post Adjustment Plate



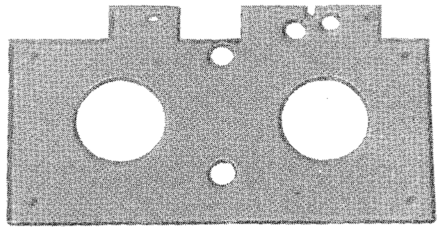
VFK0139 Reel Table Height Jig



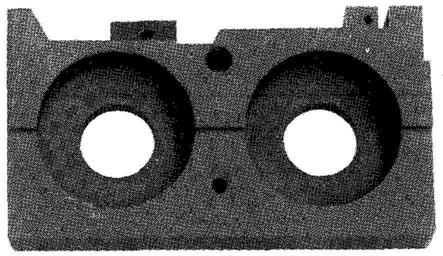
VFK0140 Cassette Lock Arm Adjustment Jig



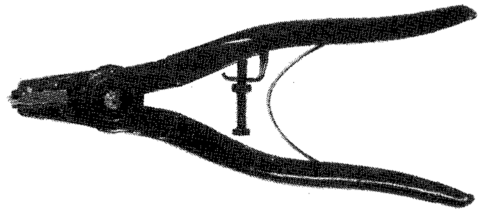
VFK0141 Capstan Reference Plate



FK0142 Cassette Holder Jig

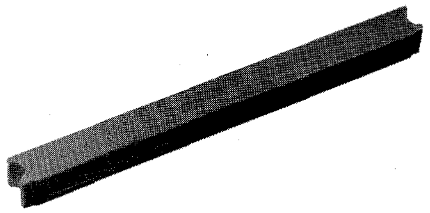


VFK0144 Retaining Ring Remover (3 mm)
VFK0145 Retaining Ring Remover (4 mm)

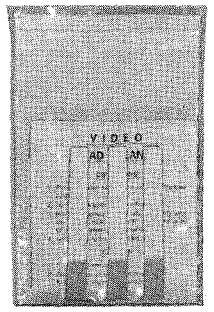


VFK0146 Hex. Wrench (0.9 mm)
VFK75 Hex. Wrench (1.25 mm)
VFK76 Hex. Wrench (1.5 mm)

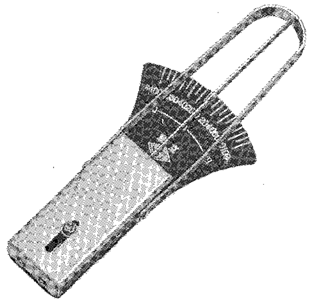
VFK0148 Cassette Tape Holder



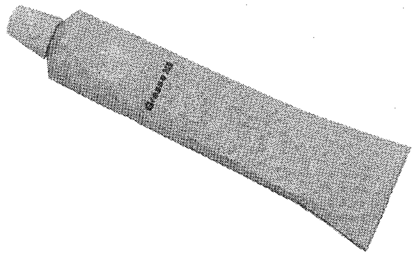
VFK27 Head Cleaning Stick



FK66 Fan-type Tension Gauge



MOR265 Morlytone Grease



MEMO

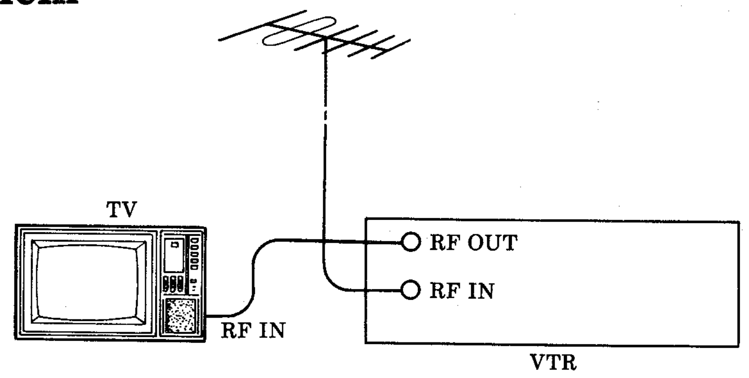
MEMO

TROUBLESHOOTING GUIDE

Make Sure That You Have a Problem

A. Before repairing, check following items at fast.

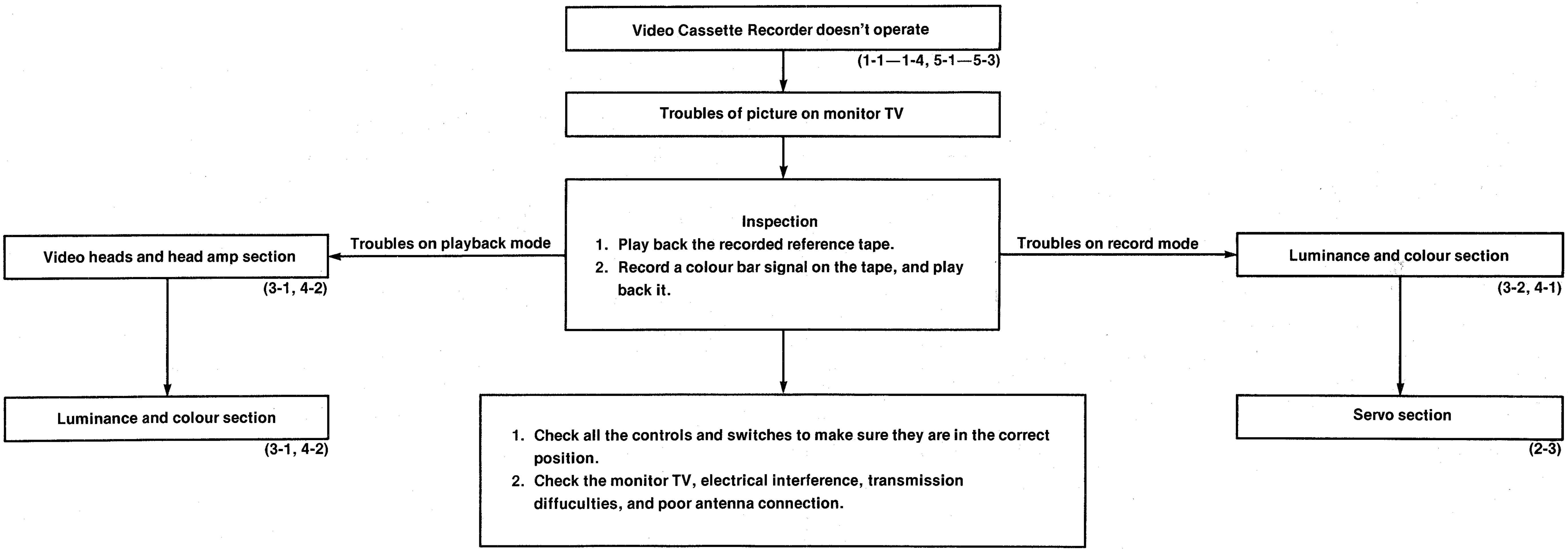
1. Place Power switch On position.
2. Place Timer Switch Off position.
3. Place Memory Counter Switch Off position.
4. Place Input Signal Selector Switch Tuner position.
5. Place TV/VTR Selector Switch VTR position.
6. Connections.


TV
RF IN
RF OUT
RF IN
VTR

1. **REGULATOR & TRANSPORT PROCESS (1-1—1-4)**
2. **SERVO PROCESS (2-1—2-3)**
3. **LUMINANCE PROCESS (3-1—3-2)**
4. **COLOUR PROCESS (4-1—4-2)**
5. **STILL PROCESS (5-1—5-3)**

B. Check that trouble is in the Video Cassette Recorder by Figure below.

Repair Process


Video Cassette Recorder doesn't operate
(1-1—1-4, 5-1—5-3)
Troubles of picture on monitor TV
Troubles on playback mode
Troubles on record mode
Video heads and head amp section
(3-1, 4-2)
Luminance and colour section
(3-1, 4-2)
Luminance and colour section
(3-2, 4-1)
Servo section
(2-3)

Inspection

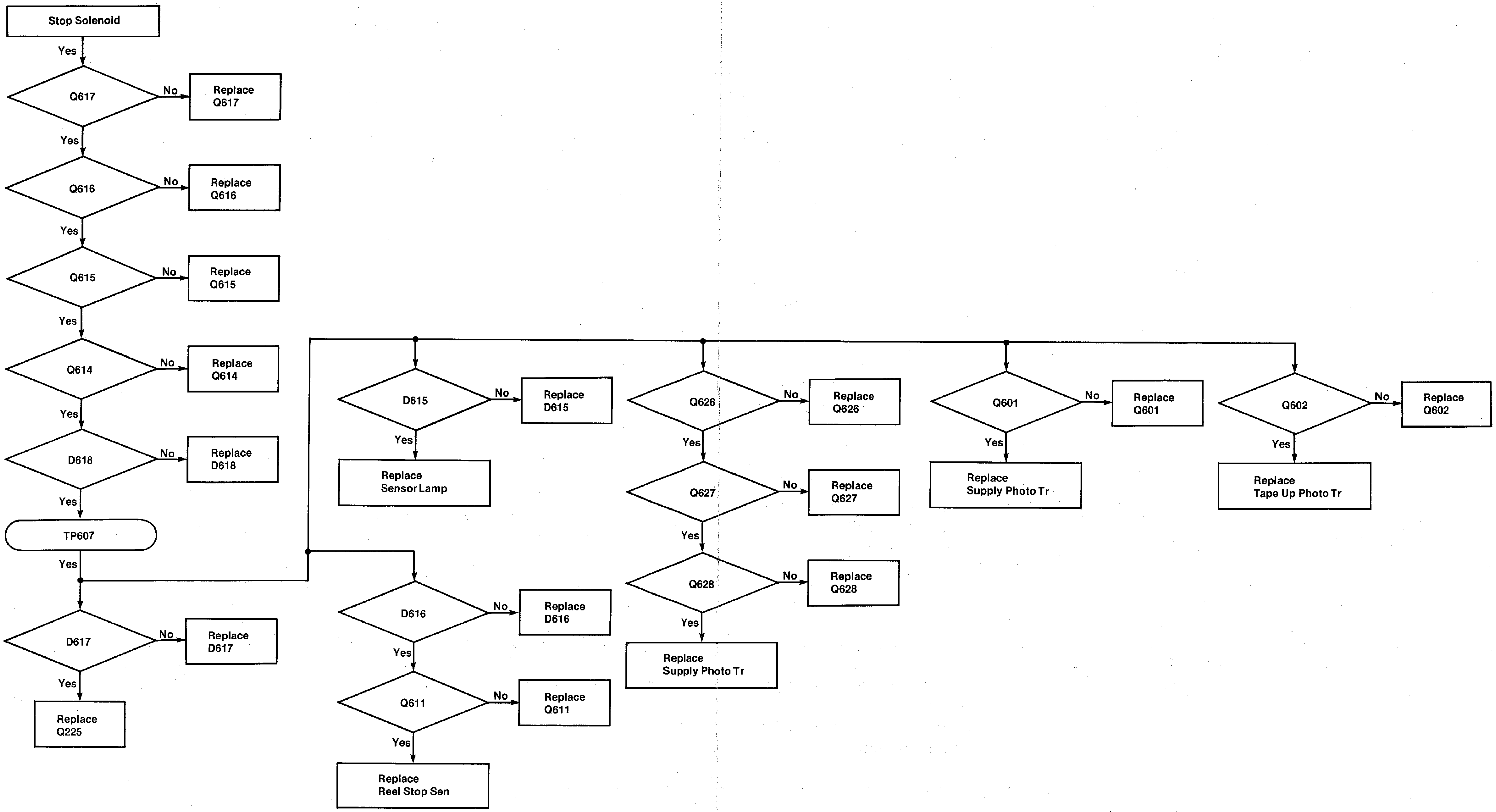
1. Play back the recorded reference tape.
2. Record a colour bar signal on the tape, and play back it.

1. Check all the controls and switches to make sure they are in the correct position.
2. Check the monitor TV, electrical interference, transmission diffuculties, and poor antenna connection.

1. REGULATOR & TRANSPORT PROCESS

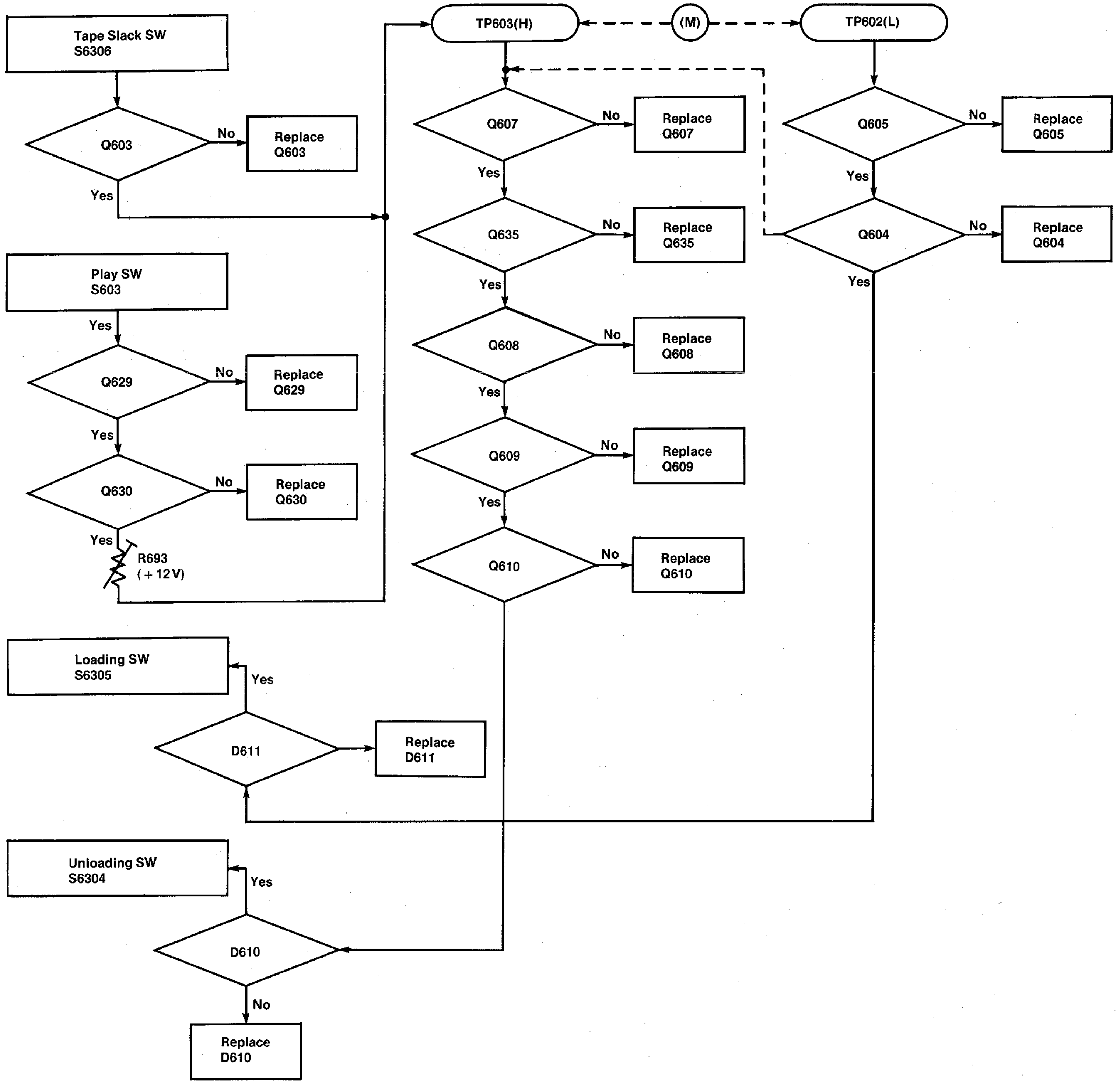
1-1. Regulator & Transport Process

When operation buttons are pressed, they are not locked.


Stop Solenoid
Yes
Q617
No
Replace Q617
Yes
Q616
No
Replace Q616
Yes
Q615
No
Replace Q615
Yes
Q614
No
Replace Q614
Yes
D618
No
Replace D618
Yes
TP607
Yes
D617
No
Replace D617
Yes
Replace Q225
D615
No
Replace D615
Yes
Replace Sensor Lamp
D616
No
Replace D616
Yes
Q611
No
Replace Q611
Yes
Replace Reel Stop Sen
Q626
No
Replace Q626
Yes
Q627
No
Replace Q627
Yes
Q628
No
Replace Q628
Yes
Replace Supply Photo Tr
Q601
No
Replace Q601
Yes
Replace Supply Photo Tr
Q602
No
Replace Q602
Yes
Replace Tape Up Photo Tr

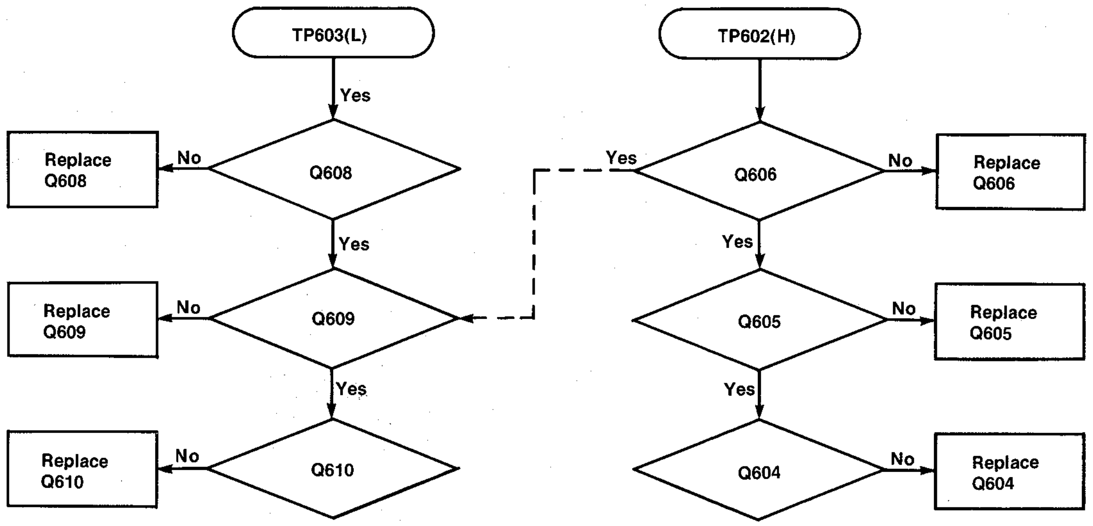
1-2. Loading Mode

Loading motor does not operate when the play button is pressed and mechanically locked.


Tape Slack SW
S6306
Q603
No
Replace
Q603
Yes
Play SW
S603
Yes
Q629
No
Replace
Q629
Yes
Q630
No
Replace
Q630
Yes
R693
(+12V)
TP603(H)
(M)
TP602(L)
Q607
No
Replace
Q607
Yes
Q635
No
Replace
Q635
Yes
Q608
No
Replace
Q608
Yes
Q609
No
Replace
Q609
Yes
Q610
No
Replace
Q610
Q605
No
Replace
Q605
Yes
Q604
No
Replace
Q604
Yes
Loading SW
S6305
Yes
D611
Replace
D611
Unloading SW
S6304
Yes
D610
No
Replace
D610

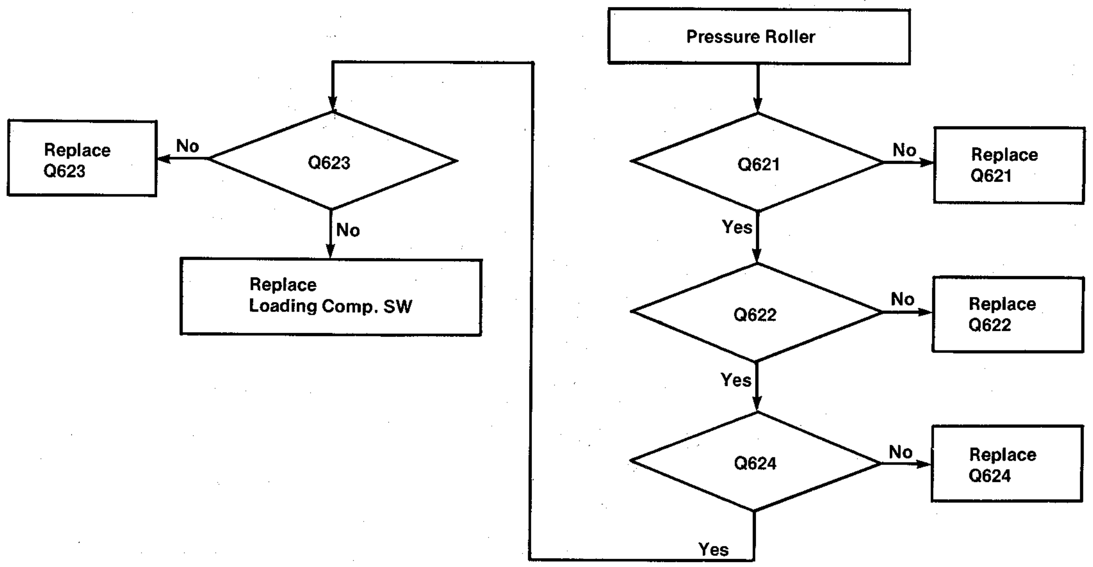
1-3. Unloading.

The unit does not unload.


TP603(L)
Yes
Replace
Q608
No
Q608
Yes
Replace
Q609
No
Q609
Yes
Replace
Q610
No
Q610
TP602(H)
Yes
Q606
No
Replace
Q606
Yes
Q605
No
Replace
Q605
Yes
Q604
No
Replace
Q604

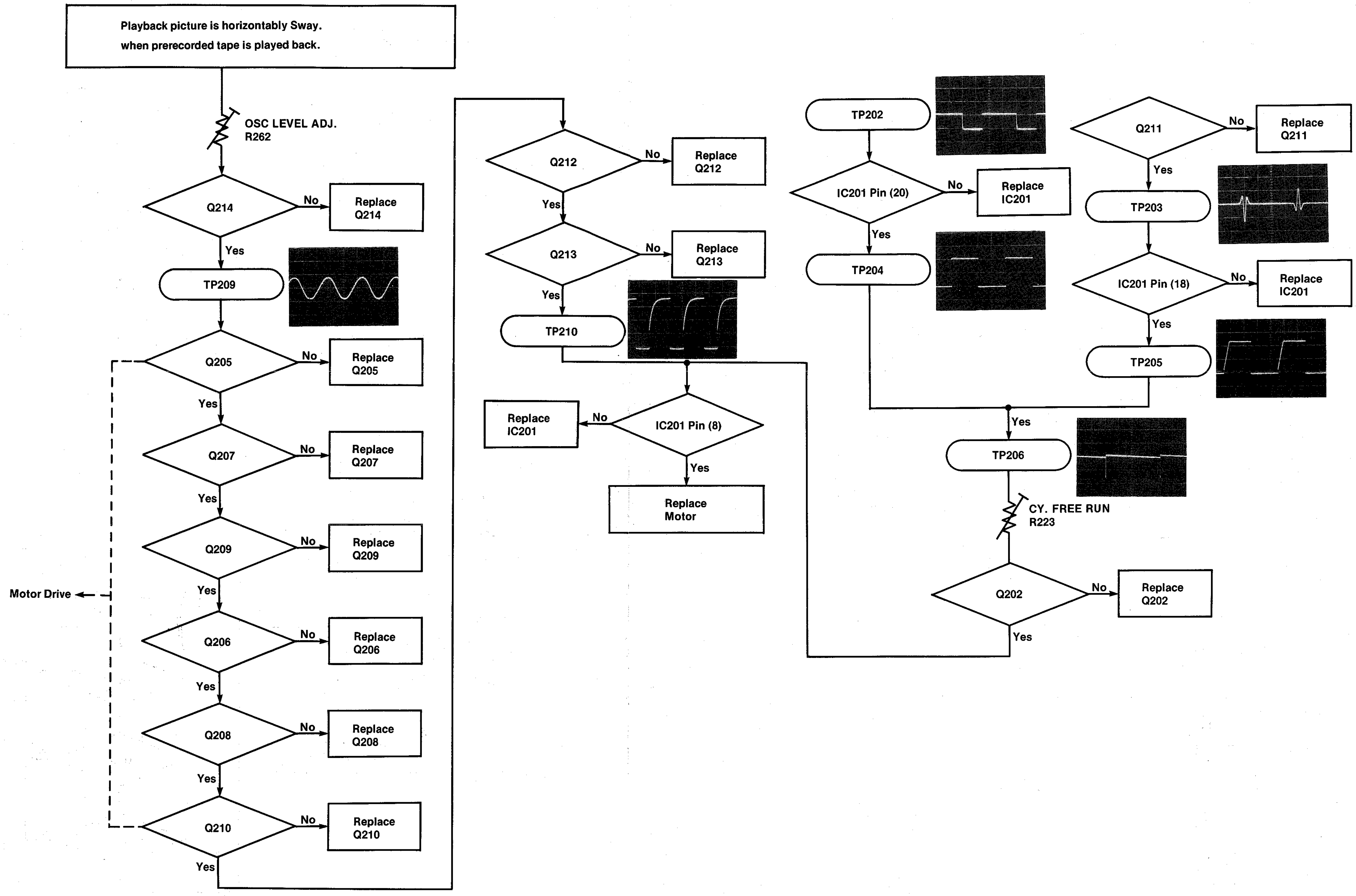
1-4. Pressure Roller.

Bessure Roller doesnot operate
when loading is completed.

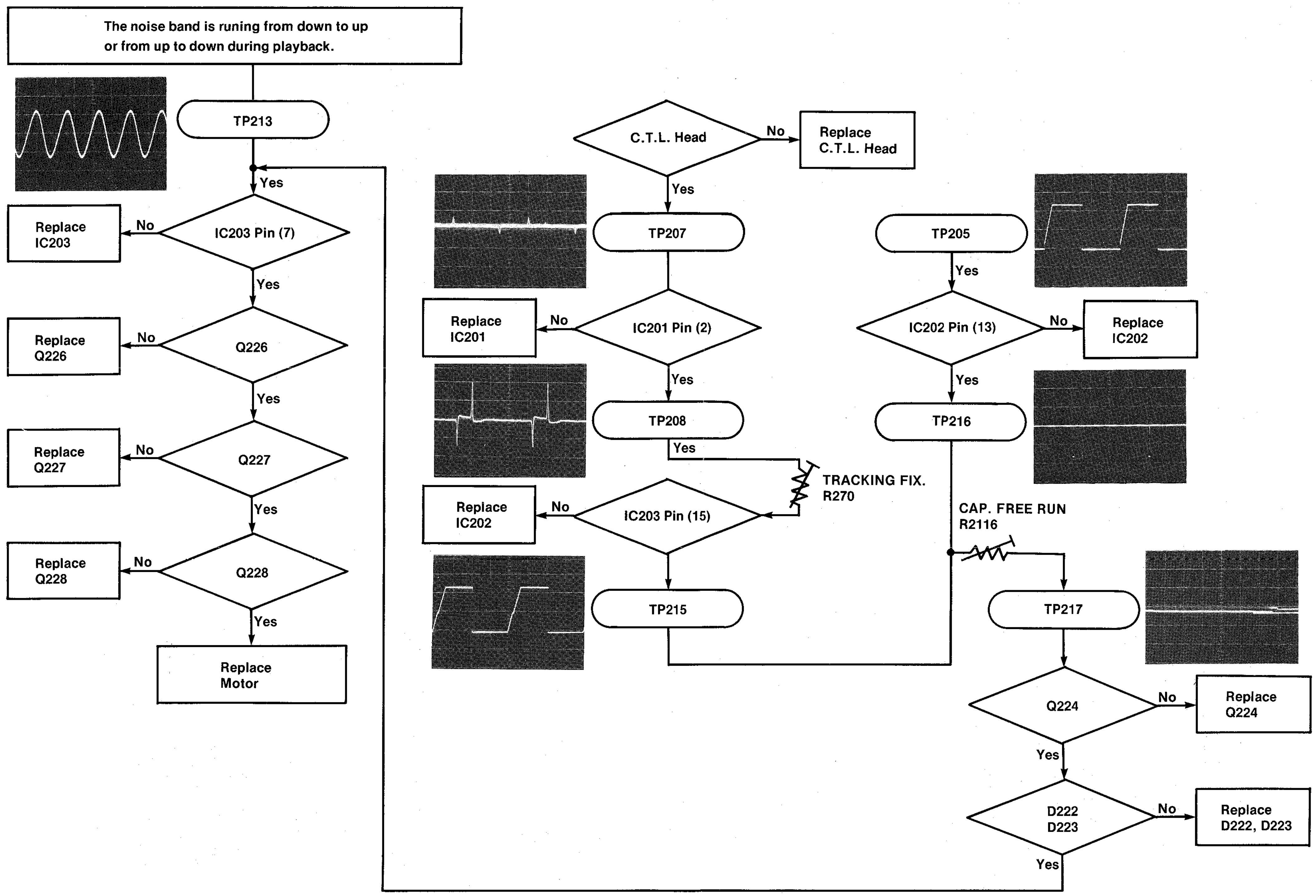

Pressure Roller
Q621
No
Replace
Q621
Yes
Q622
No
Replace
Q622
Yes
Q624
No
Replace
Q624
Yes
Q623
No
Replace
Q623
No
Replace
Loading Comp. SW

2. SERVO PROCESS

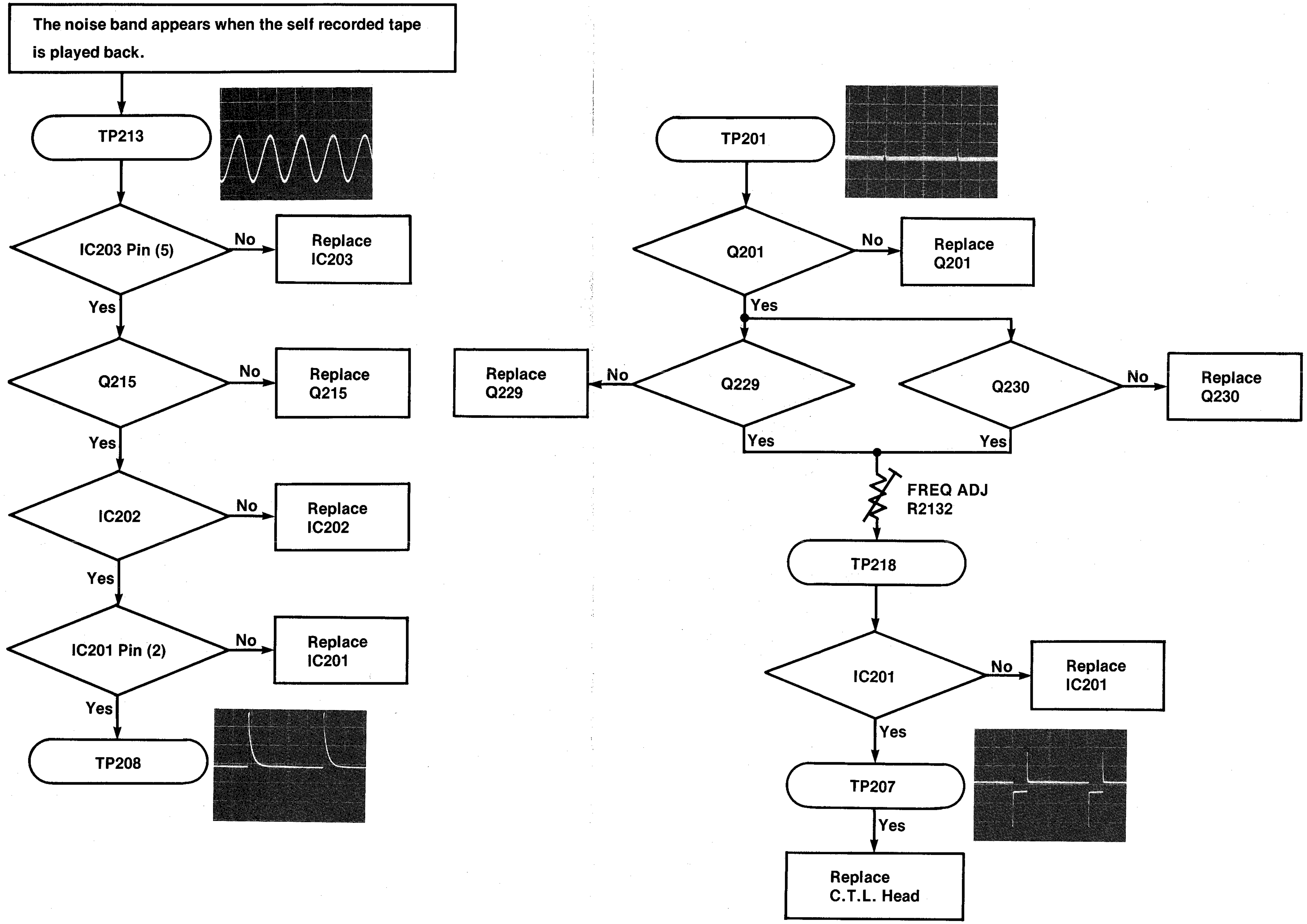
2-1. Cylinder Servo


Playback picture is horizontably Sway.
when prerecorded tape is played back.
OSC LEVEL ADJ.
R262
Q214
No
Replace Q214
Yes
TP209
Q205
No
Replace Q205
Yes
Q207
No
Replace Q207
Yes
Q209
No
Replace Q209
Yes
Motor Drive
Q206
No
Replace Q206
Yes
Q208
No
Replace Q208
Yes
Q210
No
Replace Q210
Yes
Q212
No
Replace Q212
Yes
Q213
No
Replace Q213
Yes
TP210
IC201 Pin (8)
No
Replace IC201
Yes
Replace Motor
TP202
IC201 Pin (20)
No
Replace IC201
Yes
TP204
Q211
No
Replace Q211
Yes
TP203
IC201 Pin (18)
No
Replace IC201
Yes
TP205
Yes
TP206
CY. FREE RUN
R223
Q202
No
Replace Q202
Yes

2-2. Capstan Servo (Playback Mode)


The noise band is runing from down to up or from up to down during playback.
TP213
Yes
IC203 Pin (7)
No
Replace IC203
Yes
Q226
No
Replace Q226
Yes
Q227
No
Replace Q227
Yes
Q228
No
Replace Q228
Yes
Replace Motor
C.T.L. Head
No
Replace C.T.L. Head
Yes
TP207
IC201 Pin (2)
No
Replace IC201
Yes
TP208
Yes
TRACKING FIX. R270
IC203 Pin (15)
No
Replace IC202
TP215
TP205
Yes
IC202 Pin (13)
No
Replace IC202
Yes
TP216
CAP. FREE RUN R2116
TP217
Q224
No
Replace Q224
Yes
D222 D223
No
Replace D222, D223
Yes

2-3. Capstan Servo (Record Mode)

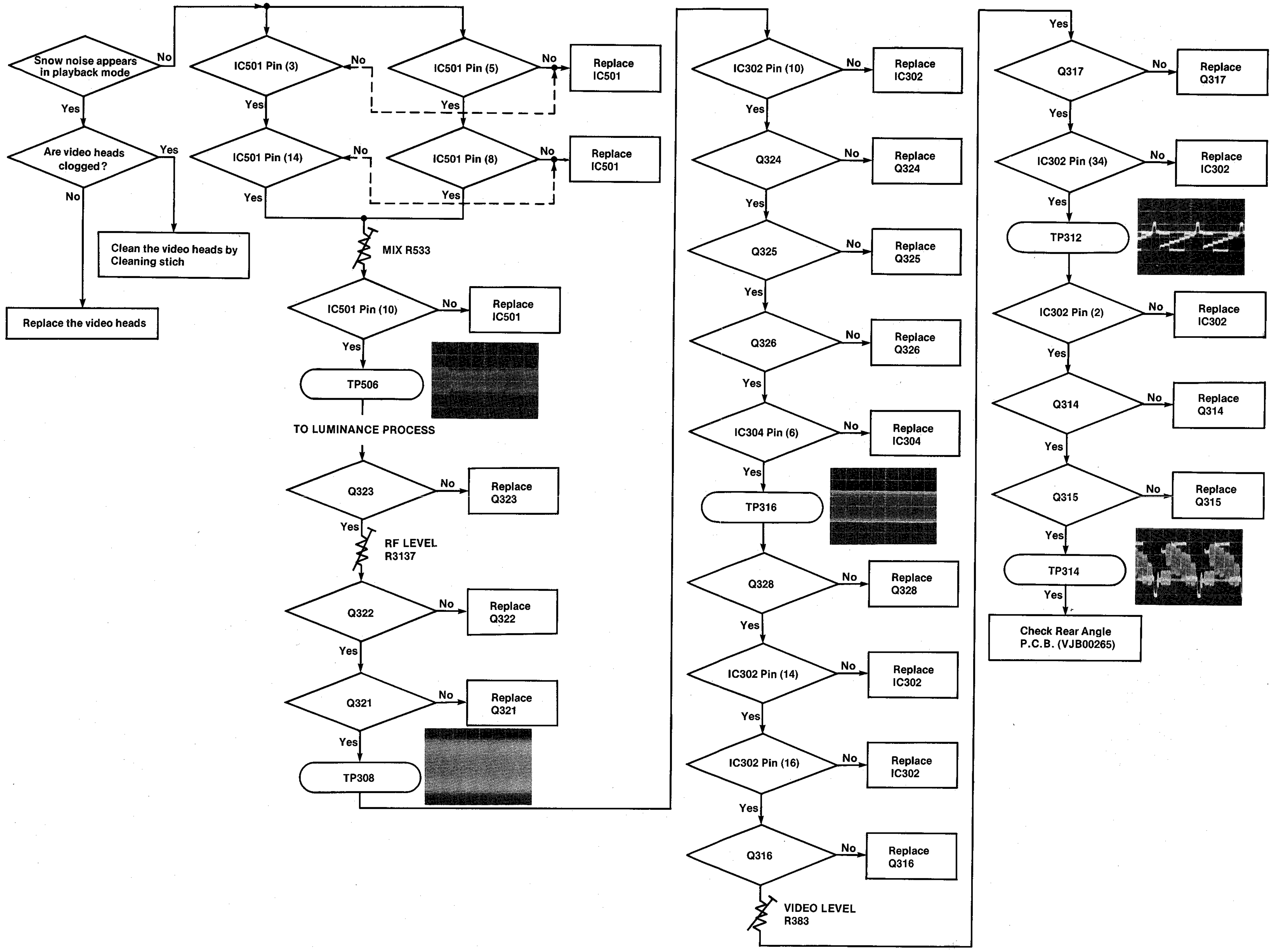

The noise band appears when the self recorded tape is played back.
TP213
IC203 Pin (5)
No
Replace IC203
Yes
Q215
No
Replace Q215
Yes
IC202
No
Replace IC202
Yes
IC201 Pin (2)
No
Replace IC201
Yes
TP208
TP201
Q201
No
Replace Q201
Yes
Q229
No
Replace Q229
Q230
No
Replace Q230
Yes
Yes
FREQ ADJ R2132
TP218
IC201
No
Replace IC201
Yes
TP207
Yes
Replace C.T.L. Head

3. LUMINANCE PROCESS

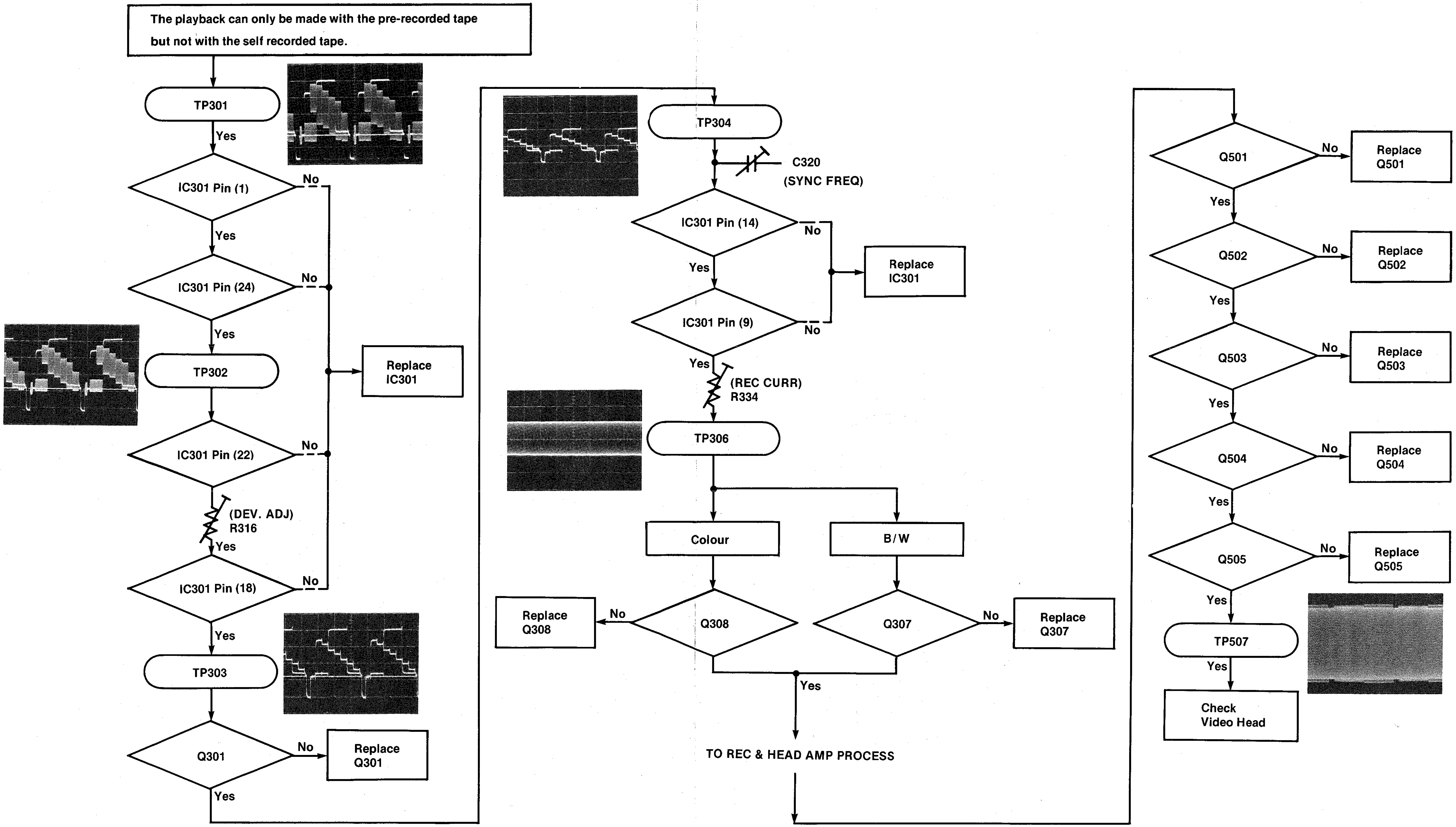
3-1. Playback Mode

No picture appears during playback when pre-recorded tape is playback.

REC & HEAD AMP SECTION


Snow noise appears in playback mode
No
Yes
Are video heads clogged?
Yes
No
Clean the video heads by Cleaning stich
Replace the video heads
IC501 Pin (3)
No
Yes
IC501 Pin (14)
No
Yes
IC501 Pin (5)
No
Yes
Replace IC501
IC501 Pin (8)
No
Yes
Replace IC501
MIX R533
IC501 Pin (10)
No
Replace IC501
Yes
TP506
TO LUMINANCE PROCESS
Q323
No
Replace Q323
Yes
RF LEVEL R3137
Q322
No
Replace Q322
Yes
Q321
No
Replace Q321
Yes
TP308
IC302 Pin (10)
No
Replace IC302
Yes
Q324
No
Replace Q324
Yes
Q325
No
Replace Q325
Yes
Q326
No
Replace Q326
Yes
IC304 Pin (6)
No
Replace IC304
Yes
TP316
Q328
No
Replace Q328
Yes
IC302 Pin (14)
No
Replace IC302
Yes
IC302 Pin (16)
No
Replace IC302
Yes
Q316
No
Replace Q316
VIDEO LEVEL R383
Yes
Q317
No
Replace Q317
Yes
IC302 Pin (34)
No
Replace IC302
Yes
TP312
IC302 Pin (2)
No
Replace IC302
Yes
Q314
No
Replace Q314
Yes
Q315
No
Replace Q315
Yes
TP314
Yes
Check Rear Angle P.C.B. (VJB00265)

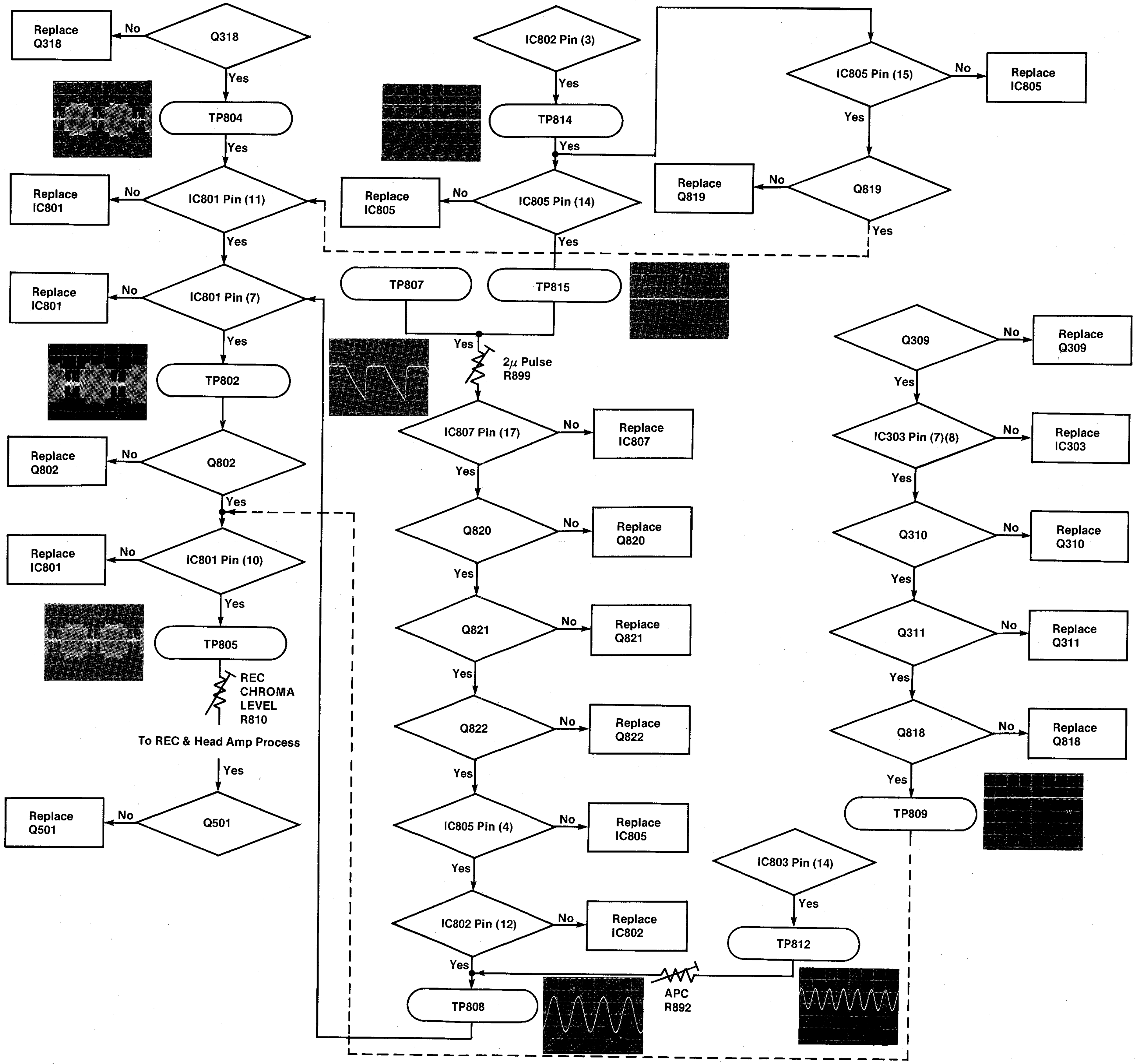
3-2. Record Mode


The playback can only be made with the pre-recorded tape but not with the self recorded tape.
TP301
Yes
IC301 Pin (1)
No
Yes
IC301 Pin (24)
No
Yes
TP302
Replace IC301
IC301 Pin (22)
No
(DEV. ADJ) R316
Yes
IC301 Pin (18)
No
Yes
TP303
Q301
No
Replace Q301
Yes
TP304
C320 (SYNC FREQ)
IC301 Pin (14)
No
Replace IC301
Yes
IC301 Pin (9)
No
Yes
(REC CURR) R334
TP306
Colour
B/W
Replace Q308
No
Q308
Q307
No
Replace Q307
Yes
TO REC & HEAD AMP PROCESS
Q501
No
Replace Q501
Yes
Q502
No
Replace Q502
Yes
Q503
No
Replace Q503
Yes
Q504
No
Replace Q504
Yes
Q505
No
Replace Q505
Yes
TP507
Yes
Check Video Head

4. COLOUR PROCESS

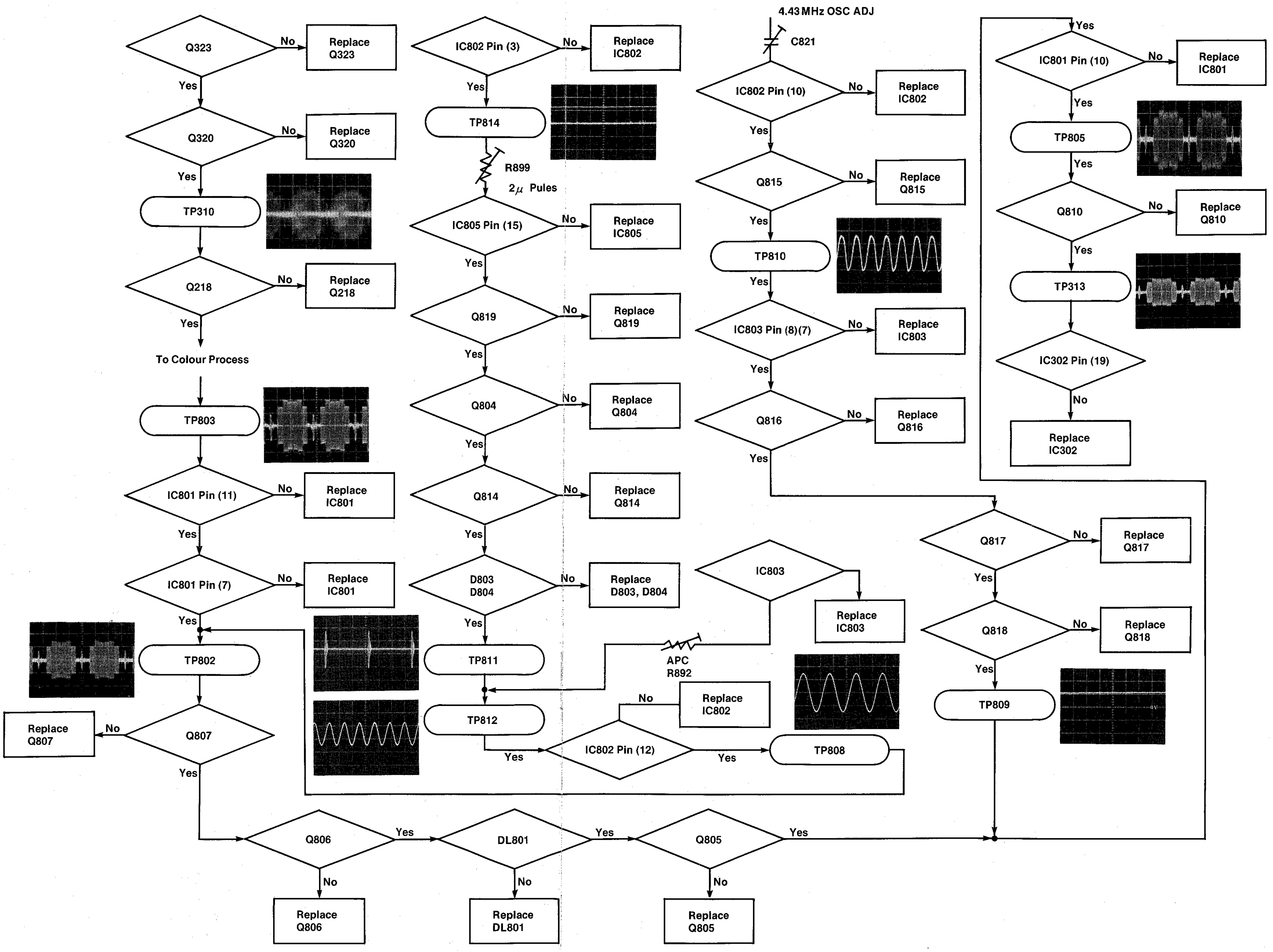
4-1. Record Mode

The colour appears with the pre-recorded tape but not with the self recorded tape.


Q318
No
Replace Q318
Yes
TP804
Yes
IC801 Pin (11)
No
Replace IC801
Yes
IC801 Pin (7)
No
Replace IC801
Yes
TP802
Q802
No
Replace Q802
Yes
IC801 Pin (10)
No
Replace IC801
Yes
TP805
REC CHROMA LEVEL R810
To REC & Head Amp Process
Yes
Q501
No
Replace Q501
IC802 Pin (3)
Yes
TP814
Yes
IC805 Pin (14)
No
Replace IC805
Yes
TP807
TP815
Yes
2μ Pulse R899
IC807 Pin (17)
No
Replace IC807
Yes
Q820
No
Replace Q820
Yes
Q821
No
Replace Q821
Yes
Q822
No
Replace Q822
Yes
IC805 Pin (4)
No
Replace IC805
Yes
IC802 Pin (12)
No
Replace IC802
Yes
TP808
APC R892
IC803 Pin (14)
Yes
TP812
IC805 Pin (15)
No
Replace IC805
Yes
Q819
No
Replace Q819
Yes
Q309
No
Replace Q309
Yes
IC303 Pin (7)(8)
No
Replace IC303
Yes
Q310
No
Replace Q310
Yes
Q311
No
Replace Q311
Yes
Q818
No
Replace Q818
Yes
TP809

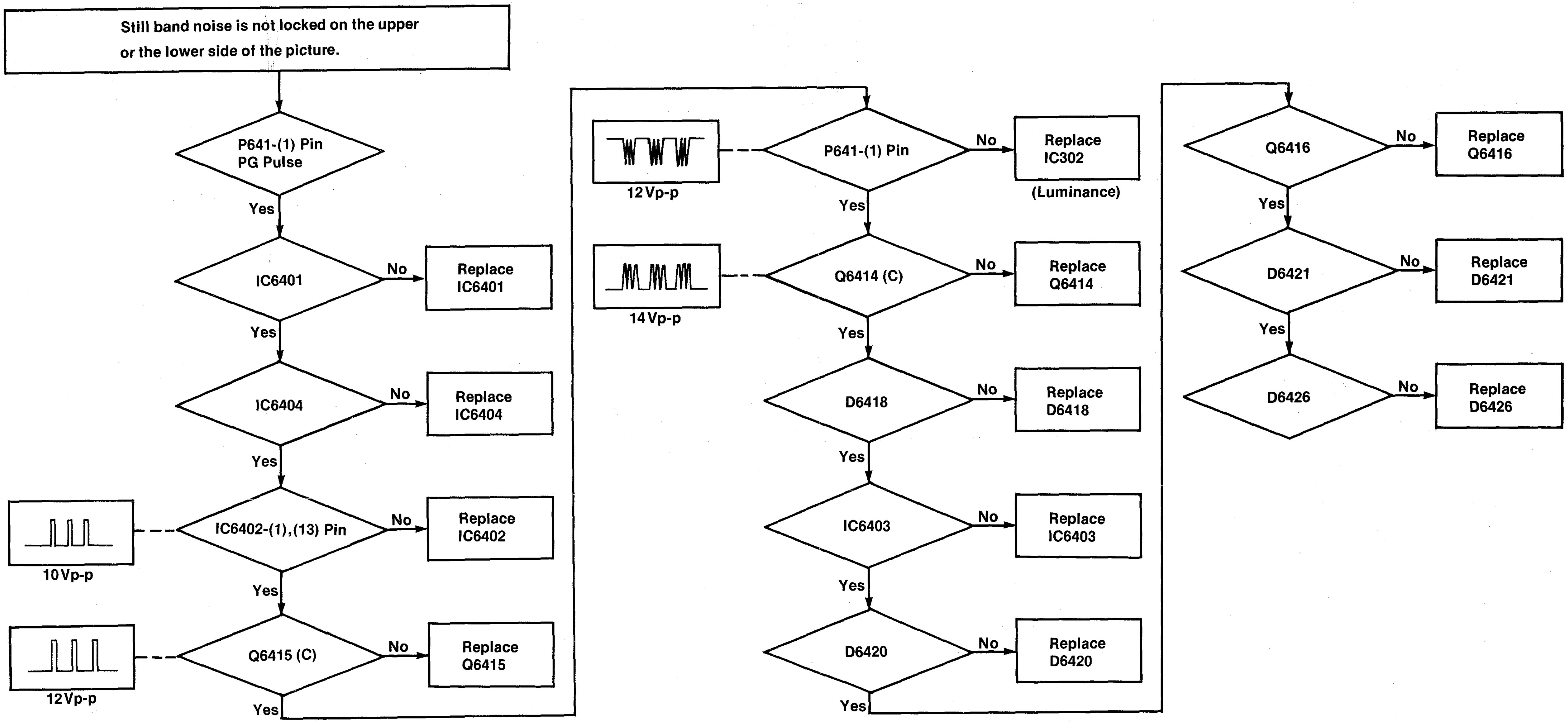
4-2. Playback Mode

No colour appears when pre-recorded tape is playback.


Q323
No
Replace Q323
Yes
Q320
No
Replace Q320
Yes
TP310
Q218
No
Replace Q218
Yes
To Colour Process
TP803
IC801 Pin (11)
No
Replace IC801
Yes
IC801 Pin (7)
No
Replace IC801
Yes
TP802
Q807
No
Replace Q807
Yes
IC802 Pin (3)
No
Replace IC802
Yes
TP814
R899
2µ Pules
IC805 Pin (15)
No
Replace IC805
Yes
Q819
No
Replace Q819
Yes
Q804
No
Replace Q804
Yes
Q814
No
Replace Q814
Yes
D803 D804
No
Replace D803, D804
Yes
TP811
TP812
Yes
IC802 Pin (12)
No
Replace IC802
Yes
TP808
4.43 MHz OSC ADJ
C821
IC802 Pin (10)
No
Replace IC802
Yes
Q815
No
Replace Q815
Yes
TP810
Yes
IC803 Pin (8)(7)
No
Replace IC803
Yes
Q816
No
Replace Q816
Yes
IC803
Replace IC803
APC R892
Yes
IC801 Pin (10)
No
Replace IC801
Yes
TP805
Yes
Q810
No
Replace Q810
Yes
TP313
IC302 Pin (19)
No
Replace IC302
Q817
No
Replace Q817
Yes
Q818
No
Replace Q818
Yes
TP809
Q806
Yes
No
Replace Q806
DL801
Yes
No
Replace DL801
Q805
Yes
No
Replace Q805

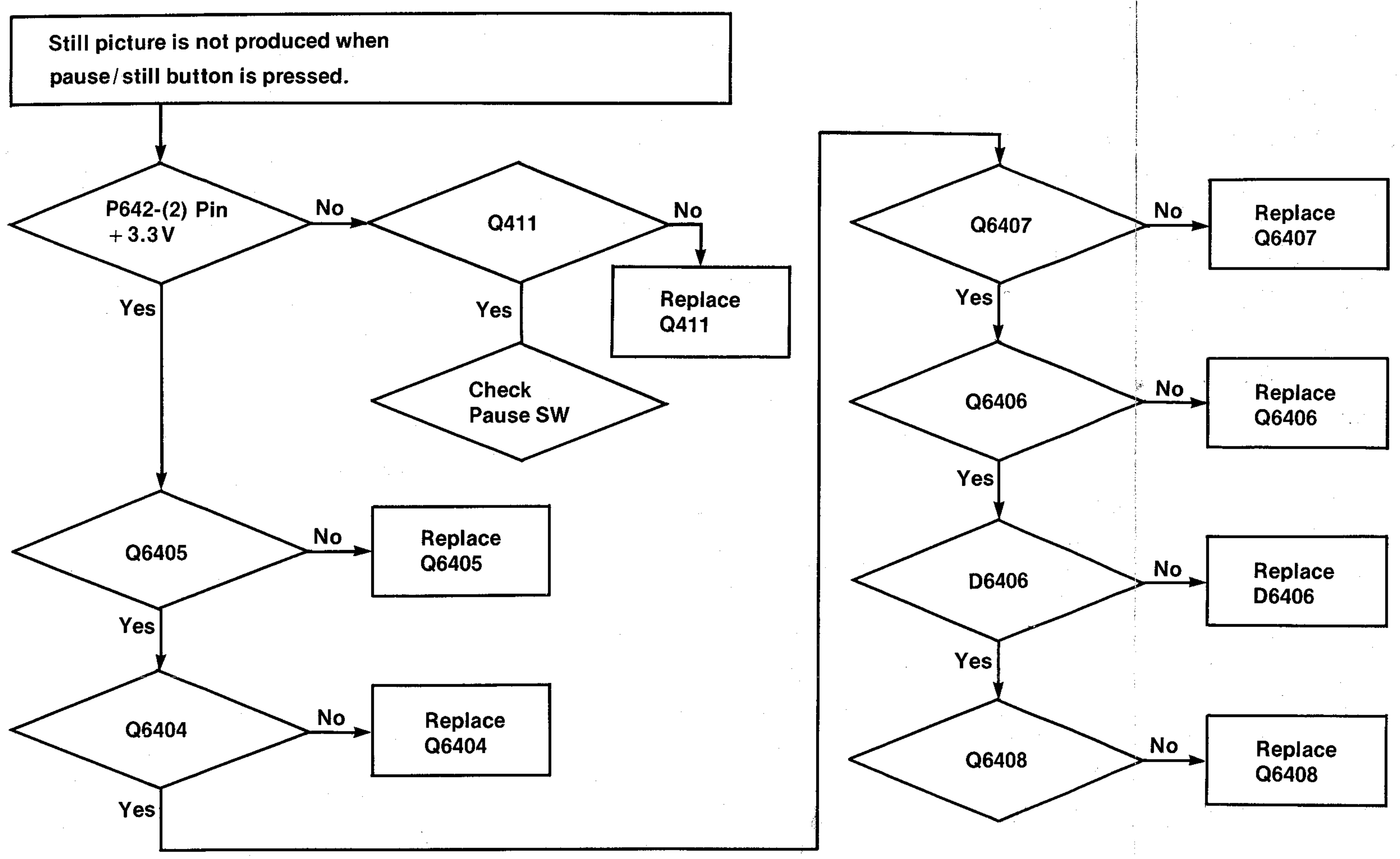
5. STILL PROCESS

5-1. Still Mode (1)

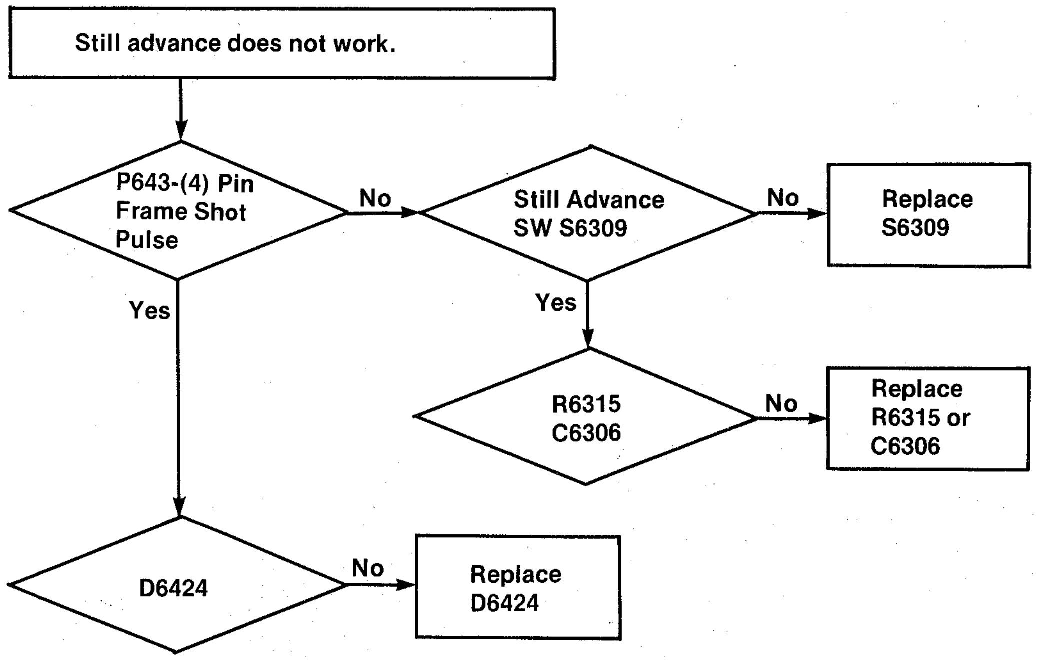


Still band noise is not locked on the upper or the lower side of the picture.
P641-(1) Pin PG Pulse
Yes
IC6401
No
Replace IC6401
Yes
IC6404
No
Replace IC6404
Yes
10Vp-p
IC6402-(1),(13) Pin
No
Replace IC6402
Yes
12Vp-p
Q6415 (C)
No
Replace Q6415
Yes
12Vp-p
P641-(1) Pin
No
Replace IC302
(Luminance)
Yes
14Vp-p
Q6414 (C)
No
Replace Q6414
Yes
D6418
No
Replace D6418
Yes
IC6403
No
Replace IC6403
Yes
D6420
No
Replace D6420
Yes
Q6416
No
Replace Q6416
Yes
D6421
No
Replace D6421
Yes
D6426
No
Replace D6426

5-2. Still Mode (2)


Still picture is not produced when pause/still button is pressed.
P642-(2) Pin +3.3V
No
Yes
Q411
No
Yes
Replace Q411
Check Pause SW
Q6405
No
Replace Q6405
Yes
Q6404
No
Replace Q6404
Yes
Q6407
No
Replace Q6407
Yes
Q6406
No
Replace Q6406
Yes
D6406
No
Replace D6406
Yes
Q6408
No
Replace Q6408

5-3. Still Mode (3)


Still advance does not work.
P643-(4) Pin Frame Shot Pulse
No
Yes
Still Advance SW S6309
No
Replace S6309
Yes
R6315 C6306
No
Replace R6315 or C6306
D6424
No
Replace D6424